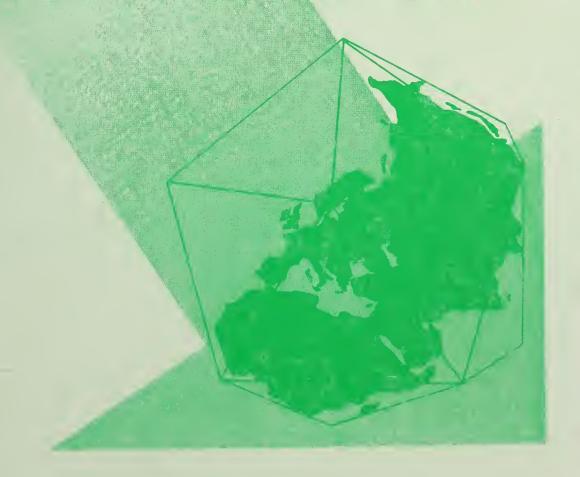


Topics of Study Interest in Chinese Medicine and Public Health:

REPORT OF A PLANNING MEETING





TOPICS OF STUDY INTEREST IN MEDICINE AND PUBLIC HEALTH

IN THE

PEOPLE'S REPUBLIC OF CHINA

Report of a Planning Meeting

A Publication of the Geographic Health Studies Program

JOHN E. FOGARTY INTERNATIONAL CENTER

for Advanced Study in the

Health Sciences

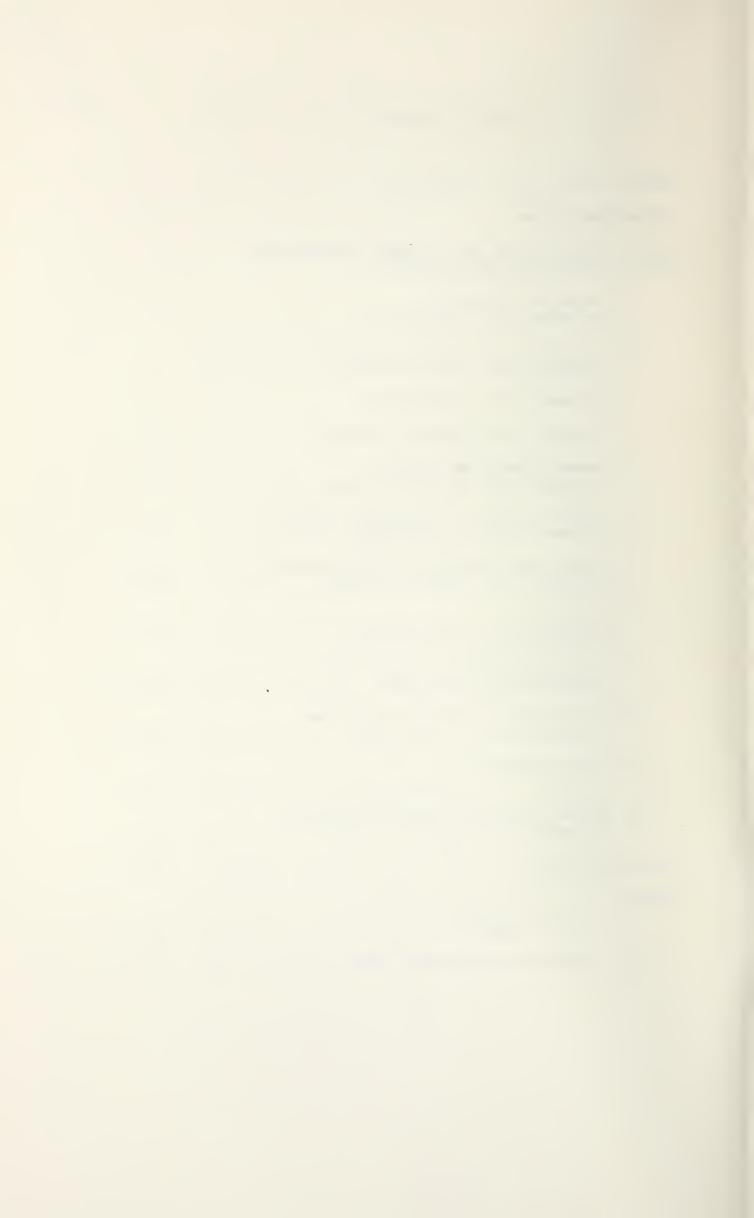
1972

U.S. Department of Health, Education, and Welfare
Public Health Service
National Institutes of Health

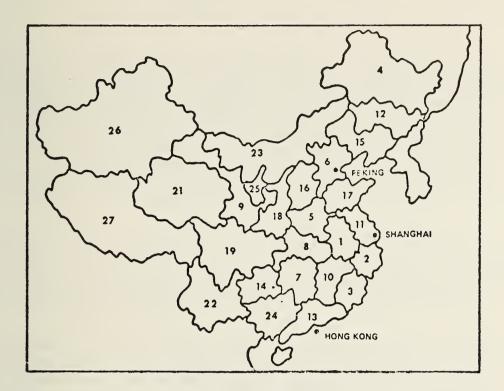
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THE PEOPLE'S REPUBLIC OF CHINA: PROVINCES AND AUTONOMOUS REGIONS



PROVINCES:

- 1. Anhwei
- Chekiang 2.
- 3. Fukien
- 4. Heilungkiang
- 5. Honan
- 6. Hopei
- 7. 8. Hunan
- Hupei
- 9. Kansu
- 10. Kiangsi
- 11. Kiangsu
- 12. Kirin
- 13. Kwangtung
- 14. Kweichow
- 15. Liaoning
- 16. Shansi
- 17. Shantung
- 18. Shensi
- 19. Szechwan
- 21. Tsinghai
- 22. Yunnan

AUTONOMOUS REGIONS:

- 23. Inner Mongolia
- 24. Kwangsi-Chuang
- 25. Ningsia-Hui
- 26. Sinkiang-Uighur
- 27. Tibet-Chamdo

MUNICIPALITIES:

Peking Shanghai

AREA:

People's Republic - 3,746,453 sq. mi.

POPULATION:

People's Republic - 750,000,000 (Est.)



PREFACE

This is a summary of an informal planning meeting concerning possible topics of scholarly interest in Chinese medicine, convened by the Fogarty International Center of the National Institutes of Health, Bethesda, Maryland on March 15, 1972. The purpose of the meeting was an open exchange of ideas among individuals with a knowledge of the People's Republic of China and/or certain areas of medicine and public health regarding subjects which might be examined in more detail through the Geographic Health Studies Program of the Fogarty International Center.

This document is therefore not intended as a status report of U.S. knowledge of any of the ten themes covered but merely an expression of the views of the discussants and other participants regarding the desirability or feasibility of studying these themes, given the limited information available and capability for examining the subjects on a firsthand basis.

The views expressed in this report represent those of the individual commentators and not necessarily those of any agency or part of the Government of the United States. Inasmuch as these opinions are only of an informal nature, this report is being reproduced in limited quantities, primarily for those with a scholarly interest in medicine and public health in the People's Republic of China and a general interest in the work of the Fogarty International Center. For ease of reference and brevity in this document, the People's Republic of China is occasionally referred to as the PRC, mainland China or merely China, without any political intent inferred.

The first document relating to Chinese medicine was published by the Fogarty International Center, NIH, in June 1972 and titled "Medicine and Public Health in the People's Republic of China." Requests for this document may be directed to the Information Officer, Fogarty International Center, NIH. A Bibliography of Chinese Sources on Medicine and Public Health in the People's Republic of China: 1960-1970 has been completed and will be published in the near future. This will provide to scholars of Chinese medicine a list of source materials which could lead to a further understanding of the subject.

As formal papers were not prepared for the meeting, a bibliography for each subject discussed was therefore not requested. A bibliography of source material on several of the subjects in medicine discussed may be obtained from the first publication of the Center referred to above.

A list of attendees which included participation by program officers and representatives of the National Institutes of Health, Health Services and Mental Health Administration, Food and Drug Administration, and other interested U.S. Government offices, is attached as Annex A. There is also appended hereto a list of

topics which warrant further examination by scholars of Chinese medicine in order to determine the value of their experience to health systems of the United States.

Inquiries concerning this document may be directed to Dr.

Joseph R. Quinn, Head, Geographic Health Studies Program, Fogarty
International Center, National Institutes of Health, who also served
as the Executive Secretary of this planning meeting.

Milo D. Leavitt, Jr., M.D. Director Fogarty International Center

INTRODUCTORY REMARKS

Dr. Milo D. Leavitt, Jr., Director of the Center, opened the meeting with the following comments:

I take great pleasure in welcoming you to the first planning meeting of its kind to consider various subjects of medicine and public health in the People's Republic of China.

About three years ago the Center became interested in the health systems established and carried out by the governments different from the United States and the effectiveness of these systems in meeting their particular health needs. This was the nucleus of the Center's Geographic Health Studies Program.

The first country to be studied two years ago was the Soviet Union, whose system has served as a health model for certain other Communist states. As a result we are better informed regarding fundamental health legislation, the role of the national government, and other subordinate administrative units in the health system; the planning process for health as a whole, including biomedical research; the effects of international cooperation upon the system; the use of the feldshers in medical care; research on nutrition; medical care; and a number of other topics. Publications on these and other subjects have been issued by the Center.

Two years ago the Center also became interested in medicine and public health in the People's Republic of China and began to examine the resources available for a more detailed study of the health system in that country.

It was considered particularly important at the time because of the health problems associated with any population of that magnitude, its geographic location, its shortage of modern trained medical personnel and reliance upon traditional medical practices, disease patterns mentioned in the literature, and other factors. A number of considerations, however, delayed our decision to proceed with studies of the health system -- the ongoing Cultural Revolution which began in 1966 which virtually prevented the formulation of any current knowledge of the health situation, the absence of recent foreign visitors to the People's Republic of China, cessation of publication of medical journals and other matters.

After Henry Kissinger's visit to the People's Republic of China in April 1971 and subsequent visits by American biomedical personnel, the prospect of obtaining a more current knowledge of the health situation appeared promising. The Center then reviewed available public health-related information and decided to convene this planning meeting.

We are not certain at this time what possibilities may develop for the exchange of visits between American biomedical personnel and those of the People's Republic of China. According to the joint press communique issued at the end of President Nixon's visit to China on February 28, 1972, the two sides discussed broadening understanding in science and technology, "in which people-to-people contacts and exchanges would be mutually beneficial." No further information is currently available on this subject.

As we are aware of the limited current knowledge of the ten topics listed on the agenda, we would like to obtain the views of the participants at this meeting regarding the importance of examining in more detail each of the themes under discussion; their possible interest to the American medical community; and if possible, the likelihood of obtaining a better understanding of the situation as a result of these studies.

To serve as chairman of this meeting we have selected Dr. John Bowers, President of the Josiah Macy Foundation, whose long-standing interest and involvement in Oriental medicine is well known. I would now like to turn the meeting over to our chairman.

Dr. Bowers thanked Dr. Leavitt for his introductory remarks, particularly for stating clearly the reason for the meeting and turned to a discussion of the first theme on the program.

Topics of Possible Study
by the
Fogarty International Center's
China Health Studies Project



1. GEOGRAPHIC PATHOLOGY

Fogarty International Center Staff Comments:

A number of diseases exist in China whose distribution is related in part to geographic factors. Notably among these are the prevalence of nasopharyngeal carcinoma in south China, and a lesser incidence in the north; a greater prevalence of esophageal carcinoma in the north of China than in the south; the presence of K'o-shan disease (a disease of the myocardium) in the northeast of China and its restriction to that area; and the presence and restriction of Kashin-Beck disease (a disease that retards bone growth and development in children) also to northeast China. Equally notable is that the Chinese themselves appear not to have devoted any significant attention to geographic pathology as a discipline.

There has been interest in the U.S. in the geographic distribution of diseases in the PRC, but the lack of any formal relations with that country has made a systematic study difficult. The apparent thawing of relations between our two countries at this time holds out the hope that studies of the diseases listed above, and others may be undertaken.

Dr. Bowers introduced Dr. Telford Work, Professor of Infectious and Tropical Diseases, School of Public Health, University of California at Los Angeles who had agreed to serve as the principal discussant on the topic of Geographic Pathology and who had worked extensively in India with the Rockefeller Foundation. Dr. Work made the following statement on the subject:

! feel rather like a blind man being introduced to an elephant for the first time, except that we are not permanently blind, just under a blindfold.

The term Geographic Pathology has different meanings to different people. At the outset I should tell you what it means to me as compared to medical geography and epidemiology. An epidemiologist is concerned with the definition of the existence of the disease. He uses statistical methods to arrive at incidence and prevalence and geographic extent in looking for the target areas where means for the prevention and control of disease can be instituted. A medical geographer is interested primarily in the geography associated with occurrence of disease.

Geographic pathology focuses on the disease. Certain factors contribute to the existence, the occurrence or the potential susceptibility of the geographic locality or area of a disease. All three disciplines obviously overlap. You can't be a geographical pathologist without some knowledge of epidemiology and medical geography.

With regard to China we have only a limited amount of information, mostly an historic accumulation. As we have already heard, current information was turned off in 1966 but we can approach the geographic pathology of China on the basis of what we learned from our involvement in World War II in that country. Some people have spent many years studying the geography of that country. More recently, intense research work on diseases of the region has been done in Taiwan. Numerous statements concerning diseases on Taiwan have been reported which, when extrapolated, can give us some indication of what occurs in the People's Republic of China.

The first significant impact on Chinese medicine was the imprint on it of western medicine, successively of western European, American, and then Soviet medicine. Western medicine focussed on the cure of a limited part of the population and high quality medical education whereas Soviet medicine focussed on preventive medicine and was preoccupied with providing some medical care to the entire population. The original health model of the Soviet Union seems to have developed under Chinese Communist auspices in a characteristically Chinese way.

What apparently did not get through was Pavlovsky's concept of landscape epidemiology. I suppose it was because Moscow was so far from Peking and it did not reach that echelon of development before the political extremes occurred. In the Soviet Union, landscape epidemiology emerges from a vast network of sanitary-epidemiological stations. One of the problems that is similar in China and the Soviet Union is that everything goes to and/or through the control center in the capital.

In 1965, when we were on the US-USSR Exchange Hemorrhagic Fever Mission in Siberia and Central Asia, we visited a number of sanitary-epidemiological stations and research institutes and found published reports that filled three large cartons. These are field reports that go to Moscow. There is no intentional withholding of this information. There are just not enough people in Moscow to read, digest and disseminate all the significant information.

But the Soviet Union has the capability of reporting on geographical pathology because of the evolution of the sanitary-epidemiology stations. A comparable network has not yet been developed in China. This is also important because the shifting border between China and the Soviet Union over the past several centuries must be remembered in consideration of geographical pathology in China.

What we are missing now in the geographical pathology of China is an epidemiological base. The organization of disease reporting, whether it is chronic disease or infectious disease, does not appear to be reported to a collating center to provide information which would allow us to assess various disease problems. I would think that one real focal point which we might center on is the development of an epidemiologic data base, a collection system which might be something the Chinese would be interested in developing.

The geography of China has been studied in many ways. Because we have only a very brief time to deal with it here, we can divide it

into the tropical area, the littoral or coastal area, the riverine drainages, the rugged and arid interior. We must not forget that geographically the areas of Manchuria, Korea, and eastern Siberia of the USSR are really one and all with China when we consider geographical pathology in that immense area. Specific disease problems mentioned in the Fogarty Center staff statement focussed on neoplastic diseases with apparent differing geographical distribution. We know more about infectious diseases, and I don't believe today these diseases are any less important to Chinese progress than they were a generation ago.

The Chinese reportedly have been successful in campaigns to eliminate flies and with vast immunization campaigns against poliomyelitis. I am very glad to have met for the first time today Dr. C. P. Li who developed the Li strain which is one of the basic elements in the Sabin polio vaccine. The Chinese refer to it as the Sabin vaccine and not the Chumakov vaccine, even though the Chinese received it from the Soviet Union.

What are the diseases which are involved? Before I go specifically into the elements of geographic pathology, there are major question marks about malaria, trachoma, Schistosoma japonicum, Japanese B encephilitis, infectious hepatitis, influenza, and other respirovirus infections which are huge problems. These are virus disease problems that Dr. Robert Channock and other virologists here are concerned with.

Historically we feel that the source of antigenic change of influenza A virus may be in south China. If we are looking for justification for American interest in respiratory virology in south China, we need only to look at this problem. Along with it are adenovirus pneumonia, tuberculosis, infectious mononucleosis, enteric hepatitis, dengue hemorrhagic fever and even that something that causes sudden death in infants which is of concern to Chinese urban populations. These are diseases that are of importance to the Chinese because they mentioned them in the literature that was available until 1966.

Now I would like to discuss geographic pathology and how it might contribute to an elucidation of these problems in China. The geographic pathologist cannot work without maps. There are three basic kinds of maps, namely spot maps, shaded area maps and contour maps that tie together the relative incidence and prevalence of diseases. In combination with overlays and a series of figures that I am going to show, these maps, I hope, will give you some insight into how this approach of overlays can be employed. Our computer technology has advanced far beyond our ability to produce verbatim information and this is what we are really after. We are seeking information on diseases that are also of interest to the United States because mankind is one family when it is afflicted with disease. Some important features of the diseases, however, may be better understood through research in China.

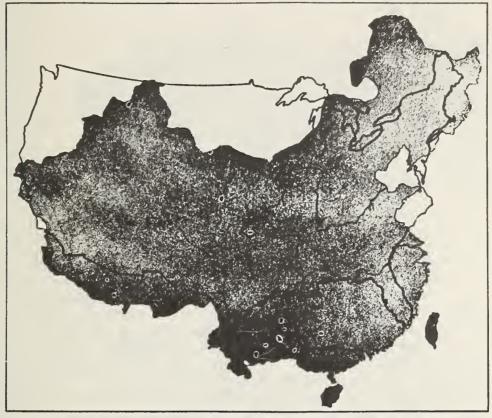
We have resources here to cooperate with the Chinese in relating their interests in geographic pathology in their country, to our own, including the use of computers. This instrument can receive all kinds of data and transmit it in various combinations. But we still need an educated mind to interpret the meaningful information in relation

to disease. We have maps, for instance, from our space program which have hardly been utilized for geographic pathology. Subsequently, however, we must come back to the ground, to the people, to the diseases that can only be studied in China by competent phsysicians and allied personnel, before we have the basic data that can go into the computer or on the maps to be used as sources for collation. Now I wonder if we can have the slides?

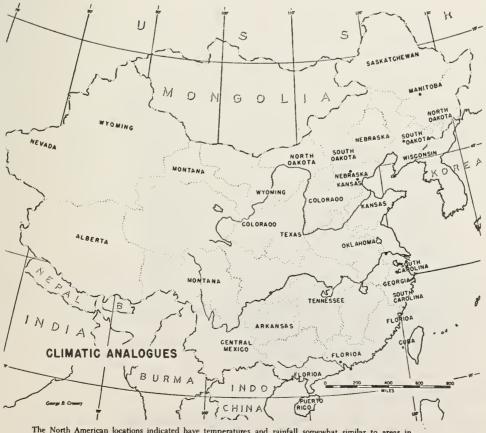
Dr. Work then presented the following slides:

These maps were taken from a number of sources, the geographical maps primarily from Cressey's book, Land of the 500 million. China is about the same size as the U.S. It is somewhat similar in that it has a populated East Coast and western regions with high mountains. It extends further into the tropics than our subtropical Florida and southern Texas. It also moves farther north into the sub-arctic region which is an area for a different geographic pathology.

Half a Billion People

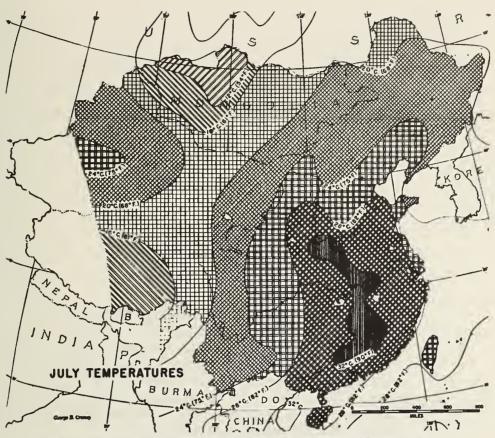


China and the United States have approximately the same size, but China has a greater range in latitude. The eastern coasts of the two countries have climatic similarities, but western China, deep in the interior of Asia, does not match the Pacific Coast of North America.

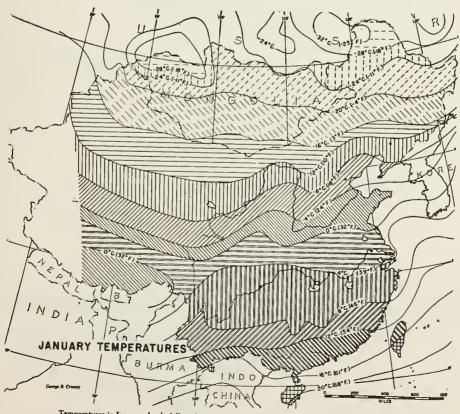


The North American locations indicated have temperatures and rainfall somewhat similar to areas in China. Comparisons such as these can be only suggestive, but they indicate the great range of Chinese climate. (Data from M. Y. Nuttonson: "Ecological Crop Geography of China and Its Agro-climatic Analogues in North America.")

Over 90% of the Chinese population lives within 500 miles of the seacoast. When you study the diseases of man you will find them where the people are most of the time. However there are medical problems in the sparsely populated interior that have probably not yet been found, just as we have with Rocky Mountain spotted fever and Colorado tick fever in the western United States. In addition, the Russians have encountered such diseases as tickborne Russian springsummer encephalitis in the development of the northern territories in eastern Siberia.



July temperatures are surprisingly uniform throughout China, with a north-to-south difference of only 14°F. Peking is often warmer than Canton, because of solar heating through the drier air. (Gherzi: "Climatological Atlas of East Asla," 17.)



Temperatures in January closely follow the parallels, with a difference of 93°F. Detween the extreme North and South. This represents the influence of the winter monsoon. (Gherzi: "Climatological Atlas of East

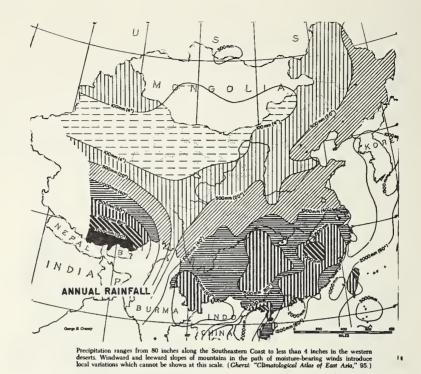
The rural population of China is still being attracted to the coastal area, but you see them also moving up the rivers because that is where the sustenance comes from through irrigated food production. A map of irrigated land is basic to understanding the disease, schistosomiasis. An overlay would relate this to the irrigated areas in southern China.



Rice is China's major crop, grown wherever water is available. In many parts of South China it represents 80 per cent of the crop acreage. (Charles Y. Hu, University of Maryland; courtesy Prentice-Hall, Inc., New York.)



Schistosomiasis in China



In examining annual rainfall, we begin to see what basically separates the different areas of China except the riverine areas which support the irrigation and the dis-

eases associated with irrigation.

We can see the largest amount of rainfall is in south China, in the tropics and the sub-tropics. Combined with the frost-free period in the warmer climate of south China, a situation is produced in which you have mosquitoes transmitting pathogens the year around. This establishes a geographical pathology for malaria and for filariasis by the two parasites Wucheria bancrofti and Brugia malayi. In south China such mosquitoe-borne parasitic diseases have far reaching ramifications. Eradication and control campaigns of the Chinese have followed systems set up by western medicine, particularly the use of hetrazan as worked out by Dr. John Kessel, principally in Polyneśia and subsequently in American Samoa.

Similarly, malaria control has followed schemes based on results of extensive studies by the Chinese based Rockefeller Foundation malariologists during the first half of this century.

Maps Courtesy of McGraw Hill Book Company, Cressey, G. B.

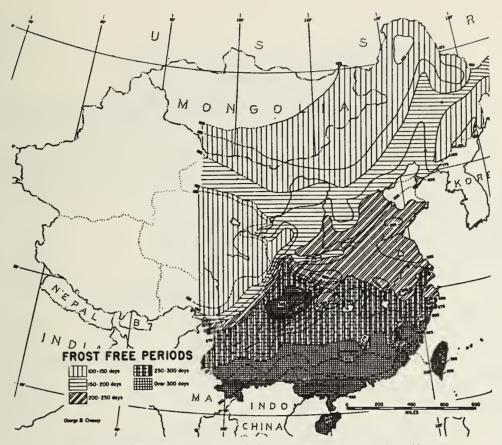
Land of the 500 Million

William Van Royen 372 Soestykfweg, Bilthoven

The Netherlands

J.B. Lippincott Company, Simmons, J.S.

et al Global Epidemiology



Normal agriculture requires a growing period of at least 100 frost-free days with suitable moisture. When the frost-free period exceeds 200 days, both summer and winter crops are usually possible. Two successive harvests of rice a year require over 300 frost-free days. With a year-long growing season there may even be time for a third crop. (Data from Charles Y. Hu, at the University of Maryland, and other sources.)



Distribution of Tertian, Quartan and Estivoautumnal malaria in China

Malaria type and percentage*

	Tertian	Quartan	Estivo- autumnal	Year
City of Province				
Hong Kong (Kao-Chiao, eastern bank of	35	2.5	62.5	1938-1940
Whangpoo River Shanghai (specimens from	60	34	6	1933
pathologic laboratories	94	0.2	6	1937-1939
Nanking (Kiangsu)	56	2.4	38	1933
Anhwei	77	1.2	27	1935
districts)	73	0.4	26	1934
Fukien	74	19	7	1935
Kweichow	20	22	69	1940
Szechwan	52	7	47	1940
Yünnan (Shan tribes)	26	5	69	1940
Chungking	86		9	1940
Hainan Island	39	24	37	1940

*This table was compiled from several sources. Because of dissimilar methods of presentation in the original sources, percentages do not, in all cases, add to 100. The trends, however, are unaffected.

Also, the population distribution is affected by climatic differences which condition clustering of habitation that favors human association with rodents and their ectoparasites. This is illustrated by plague, a rural disease which ranges from the warm littoral of the south to the cool interior of the north.



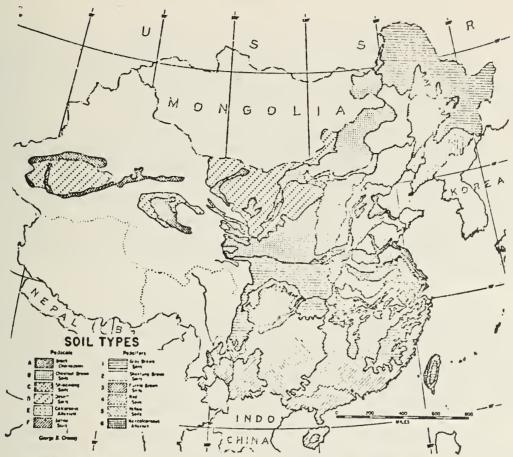
China may be divided into 10 major climatic provinces and numerous regions on the basis of these Koeppen symbols. The symbols are described in the text; in general A represents tropical climates, B stands for arid and semiand conditions, C and D are moderate climates with long or short summers, respectively, while E climates are those found in high mountains or the Arctic. (A. Lu: "Climatological Atlas of China," 96.)

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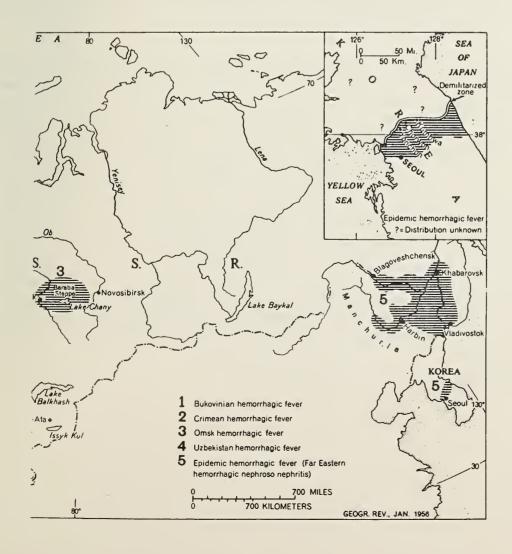


Plague in China

We should look at the soil types which is another factor that seems to support certain disease phenomena such as Korean hemorrhagic fever. In the northeastern corner of the map of Asia, Korea is really just an extension of the same geography if one is discussing disease areas. If we look at the rural population we see the scattering in this area in the northeastern part of China.



Chinese soils include a wide array of types, some good, some poor. This map can only suggest the major categories. Pedocals tend to be unleached and are high in lime while pedaffers are generally leached soils with relatively abundant aluminum and from (Thorp, Generalized Soil Map of China, and other sources.)



In 1951 the United Nations forces encountered hemorrhagic fever in Korea. Reference to this "new disease" was found in the literature of the Russians and Japanese, who encountered this disease before World War II in the eastern areas of Siberia and in Manchuria.

In recent years hemorrhagic fever was still being encountered in Korea. We are not certain whether this disease has been prevalent in northeast China, but from Soviet literature we know that there is a very extensive area of occurrence along the Manchurian-Soviet border and on down the Amur River drainage. This is a disease that is called hemorrhagic fever with renal syndrome or nephrosis-nephritis by the Russians. They are finding it a disease of much greater extent in the Soviet Union. It has emerged as a major problem as the Russians have settled and developed eastern Siberia.

If the population increase in China continues the way we will hear about later today, it is important to focus on areas where there are not many people now, because these will be occupied by people in the future. As the sparsely populated areas are introduced to modern technology with regard to an ability to move water and with the introcution of different agricultural crops, we can expect an increase in detectable disease problems in northeastern China.

What I am trying to convey to you is the importance of the use of maps with overlay technique and interpretations of geographic pathology using them not only with limited information obtained from many sources, but as a basis for looking at the kind of disease problem the increasingly mobile population of China will meet. If they are receptive to our inquiries into geographical attributes, there is much to be said for communication and cooperation in constructing a geographic pathology of China.

2. EPIDEMIOLOGY OF INFECTIOUS AND PARASITIC DISEASES

Fogarty International Center Staff Comments:

The control of infectious diseases has always occupied the principal position in Chinese health campaigns. Chronic shortages of well trained medical manpower, medical facilities, and medical supplies have made definitive control of many infectious diseases difficult to achieve and maintain. Emphasis on preventive medicine, the rapid training of paramedical personnel, and a system of organization that permits the rapid marshalling of medical assets, however, has permitted the Chinese to contain most serious epidemics in recent years and generally to reduce the great loss of worker productivity from infectious diseases. Successes to date in combating parasitic diseases such as schistosomiasis have not been decisive and have been concerned mostly with vector control.

Principal infectious and parasitic diseases that suggest themselves for study, based on apparent Chinese priorities, are: schistosomiasis, tuberculosis, cholera, virus influenza and mutants, bronchitis, bacillary dysentry, and malaria. To date, Chinese publications reflect research on new drugs against primary and advanced schistosomiasis, research on the causes and treatment of chronic bronchitis, and the development of better preventive measures against all of the above.

Dr. Bowers introduced Dr. Oscar Felsenfeld, Chief of Communicable Diseases, Delta Regional Primate Center, Covington, Louisiana, who discussed the next major theme on the program, "Epidemiology of Infectious and Parasitic Diseases". His remarks follow:

I am most grateful for being included in this conference but I feel quite ill at ease introducing the discussion on infectious diseases in the People's Republic in China. After the very thorough survey of arboviruses and their vectors, climate and other environmental factors presented by Dr. Work, and in the presence of experts like Dr. Robert Chanock, I do not feel qualified to speak about Dr. Work also commented on schistosomiasis and filariasis before the Great Leap Forward. Most regrettably, Dr. Emery W. Dennis, Director, Biology Division of the Sterling Winthrop Institute, who is an expert in this field, is not with us. Dr. Skinsnes certainly knows more about tuberculosis and leprosy in China than I. Moreover, I have not been to the mainland since 1948. My information is derived from Far Eastern, East European and Albanian literature as well as from discussions with refugee or visiting physicians in Macao and Hong Kong, and with Chinese delegates to various international meetings. Such reports are usually biased. For that reason, I will restrict myself to the epidemiology and control of bacterial diseases in general terms rather than attempting to render concrete data.

The Fogarty Center's staff summary statement for this meeting contains an excellent summary of the development of medical education and practice in China during the past 30 years, as well as faithful analysis of vaccines, the principal means used in the past in attempts to control bacterial epidemics. I agree that those produced in the People's Republic of China have improved particularly since the Cultural Revolution.

It has been frequently noted that the epidemiologic situation in China is not very well known. Interestingly, more information is available about epizootics, particularly those which were brought under control. But no information is available on plague since 1950. Reports from Mongolia and the USSR hint that plague is still endemic in North China, at least in its campestral form. The plague vaccine, prepared from an attenuated live organism, is routinely manufactured and readily available from the Shanghai Serum and Vaccine Institute.

There have been at least two outbreaks of cholera in China. first, in 1962, was probably imported by Chinese returning from Indo-A second outbreak started during the Cultural Revolution. extent is unknown because the epidemiological teams working in Canton and along the southeast coast were brought in from other areas of China and did not report to local physicians. At present, the rural and coastal areas of Kwangtung and the lake region of Yunnan are suspected of having become endemic foci. The estimates of the number of cholera cases during the last five years range between 10,000 and 100,000. The control of cholera is carried out by teams consisting of "barefoot doctors" and such paramedical personnel as sanitarians, vaccinators and nurses. Principally, vaccination, oral fluid replacement, medicines derived from tannic acid containing traditional herbs, and public health education are used. According to available information, public health education in the spirit of the present era is carried out by all members of the health team. Little is known about intravenous fluid administration. Reports of the antibiotics employed are conflicting. Evidently they vary from one area to another and according to availability. A study of the composition, equipment, logistics, methods of reporting, and detailed guide-lines issued to these teams would be of great value because highly trained manpower is saved by their use. The health teams appear to be quite mobile and closely coordinated by a central agency.

Typhoid fever still persists in China. Periodic vaccination campaigns and sanitary measures are undertaken. The quadruple choleratyphoid-paratyphi A and B vaccine is often used. The extent of improvement of sanitation in cities is reported from time to time in the lay press but only spot-reports are available from rural areas, where bacillary and amebic dysentery are also present.

The supervision of food manufacturing establishments producing export items appears to be at a high level, as one may judge from the bacteriological examination of these goods. Evidently fly-swatting is no more the principal means to reduce food-borne infections, as it was in the 50's. Flies are reportedly rare but not the only vehicle of enteric infections.

Brucellosis is another disease of interest. The use of live vaccine and improving milk hygiene seem to be the principal control measures. Hogs, sheep, goats and cattle are tested at least in several areas in eastern China by barefoot veterinary teams. It may be added that the control of the dog population may have reduced the propagation of diseases carried by these animals.

Leptospirosis persists along the rivers.

The progress of eradication of disease-bearing ectoparasites in the hill regions of the south is slow. Health centers appear to carry the principal burden in controlling such infections.

Little is known about parasitic diseases in the People's Republic of China. The presence of malaria is often denied by Chinese authorities, at least on the regional level. Schistosomiasis appears to remain a menace. The much advertised Chinese nitrofurans as therapeutica did not yield satisfactory results outside that country in man and experimental animals. It is believed by some that agricultural drainage may not be well coordinated with snail eradication. Before the Cultural Revolution, the Anti-schistosomiasis Institute on the Yang-tse River was accessible to foreign visitors but reports on the use of sophisticated molluscacides did not become available in the press.

Epidemiological surveillance operations appear to be hampered by the shortage of mobile laboratories and perhaps by the insufficient expertise and flexibility of the briefly and one-sidedly trained laboratory workers.

As noted in the staff summary for this meeting, we are observing a shift from quality to quantity in epidemiological work in China. The unquestionably great value of mobile paramedical teams is worthy of study, particularly when developing countries are kept in mind. Public health education, one of the most effective weapons in the control of epidemics, appears to operate jointly with socio-economic and political erudition which has been applied with success also in Burma. The resulting willingness to do things to stop disease and the desire for better sanitation are valuable for improving sanitary conditions. The formation of a one-class society with a deemphasis of the role of the well-trained scientist may perhaps undergo revision during the years to come, as it did in the USSR.

The aim of the Cultural Revolution was to demonstrate that the People's Republic of China is self-sufficient, does not need outside help, and wishes to become independent of the West, particularly of Western medicine. Therefore the approach recommended by Dr. Leavitt on a people-to-people basis, using selected topics of mutual interest, appears to be the only feasible way to advance medical cooperation between the two countries. From the point of view of epidemiology, we may learn much from the Chinese way of training, equipping and using epidemiologic teams. On the other hand, it is quite difficult to predict without close person-to-person contact what we have that would be of interest to the People's Republic of China at present. Perhaps the field of epidemiologic epizootic surveillance would be

one of the possible points of exchanging ideas. Another might be the use and maintenance of feasible experimental animal models. Finally, the advanced serum and vaccine centers which have been and are following Western patterns, may be interested in exchanging views on the control of biologicals and drugs.

Dr. Bowers introduced Dr. Olaf Skinsnes, Professor of Pathology, University of Hawaii, who was born in China and worked in the Department of Pathology, University of Hong Kong, from 1949-1959. Dr. Skinsnes made the following comments on his obervations and knowledge of various infectious and parasitic diseases:

Neither the journal <u>China's Medicine</u> (previous <u>Chinese Medical Journal</u>), nor popular magazines such as <u>China Reconstructs and China Pictorial</u>, which frequently carry medical and public health news, have addressed themselves to the subject of the public health aspects and treatment of leprosy. In recent years there has been little information seen in the Chinese newspapers about the subject.

In the early 1950's, the major medical news from China related to the use of "tissue therapy" in the treatment of wide variety of diseases. The <u>Ta Kung Pao</u>, <u>Hsin Hua Pao</u>, and the <u>Jen Min Jih Pao</u> of 1950 and 1951, printed numerous reports. "Tissue therapy" was based on the earlier work of the Russian ophthalmologist Vladimar Petrovich Filatov, a member of the Academy of Science of the U.S.S.R. in 1912 and subsequently. His thesis was: "Any tissue of an animal or plant, once placed in an environment unsuitable to its existence but not liable to kill it, will undergo a biochemical change in order to maintain its existence. This change will produce a specific substance, which tends to accumulate to keep its mechanism alive. When such a substance is placed in an abnormal or diseased organ, it will produce a highly powerful stimulant and cause the diseased part to undergo a change. It will cure the disease. This product is called the 'biogenic stimulant." Chinese adaptations and experiences with this treatment were enthusiastically reported on September 3, 1951, at a national symposium on tissue therapy called by the Ministry of Health. tics were presented to show that the method had been applied to 28,854 patients with a resulting cure rate of 75.34%. Tissue therapy for leprosy was reported in news accounts from the Tung-Kun Leprosarium in south China as resulting in striking disease remission after about three months of treatment. The treatment employed was the transplantation of thyroid and adrenal glands removed from calves. Not reported was the fact that patients in this leprosarium had been under treatment with diasone and sulphetrone for periods of up to two years prior to the institution of tissue therapy.

During this same period an official group of leprosy concerned physicians arrived in Hong Kong from Peking for consultation with us regarding leprosy and with suggestions for future collaboration. These individuals were not enthusiastic about tissue therapy. Nothing further came of this contact.

During the latter part of the 1950's, reports from leprosy patients arriving in Hong Kong from the People's Republic of China indicated that tissue therapy had been abandoned, that leprosaria were being continued though some had been turned into army barracks, and that sulfone drugs were being used and manufactured in China.

At this period Russian scientists were active in consultation in Likewise, Russian physicians, among them the distinguished leprosy expert Dr. N. A. Torsuev, were influential. Professor Torsuev has recently made available to us a book entitled, <u>Collection of Studies in Leprology and Dermatology</u> (in Russian), No. 14, edited by A.A. Antoniev, N. A. Torsuev and P. S. Grebennikov, 1,500 copies of which were published by Rostov University in 1960. Part of this work apparently grew out of their experience in China, for two chapters covering 131 pages are devoted to leprosy in China. Chapter 1 is in four sections dealing with the history of leprosy in China to 1949, with methods of diagnosis and therapy and recognition of leprosy, with the incidence and geographic distribution of leprosy, and finally with earlier methods of antileprosy work. The second chapter presents a detailed account of a considerable number of Chinese herbal and other popular Chinese treatments, some of which may be related to leprosy therapy, though our comprehension of Russian is too limited to be sure of this latter point. Interesting though this work is, it does not present any significant account of leprosy work in the People's Republic of China. Most of it appears to be a literature review from early Chinese medical journals with numerous references to well-known missionary leprosy workers and their writings in the 1920's and 1930's.

During the past two decades there has been a steady trickle of sick persons into Hong Kong from the PRC in search of medical treatment. At times up to 50% of the patients in the wards of some hospitals have been such patients. Many patients with leprosy have been among them, though no survey has been made known as to how many. The greatest influx of leprosy patients in a short period of time occurred when the border was briefly relaxed in 1962, and over some 100,000 persons came into Hong Kong in a few days. Among them were a considerable number of patients with leprosy. From three to four months after entry into Hong Kong, these leprosy patients began to appear in leprosy clinics, having by then established their position in Hong Kong and feeling that the danger of expulsion had passed.

For such patients it was determined that the treatment of leprosy continued, that some leprosaria functioned, and that treatment was similar to that elsewhere in the world with respect to the standard sulfones used. There was no evidence of any reconstructive surgery, and there did not seem to be any follow-up of patient contacts. Hospitalization was mandatory when leprosy was diagnosed. Skin smears for acid-fast bacilli were performed four to five times per year and patients were discharged about half a year after their bacterial smears became negative. One patient seen in early 1972 brought with him a treatment card indicating that he had received Rimifon treatment as well as DDS.

Most of the immigrant leprosy patients seen came from south China and many had been treated at Sun Chow Leprosarium in Shekwan, Kwangtung

(operated by the Catholic Church prior to 1949). Thus, their limited and sometimes reluctant information did not provide any broad picture of the program in China as a whole.

From all available sources, admittedly meager, it thus appears that for the past two decades leprosy treatment has been continued and, following the transient experience with tissue therapy, was largely done so by the use of sulfones. Patients are mandatorily hospitalized and in all probability there is a central registry of all such patients. There does not seem to have been any extensive program of case finding.

Prior to 1949, the commonly held estimate was that there were probably about one million patients with leprosy in China and that 100,000 of these were in Kwangtung Province. Considering the known pattern of leprosy epidemiology, it is unlikely that there has been any significant change in patient numbers in the past two decades. Certainly no facts or figures have been made available that would provide a basis for an alternate or better estimate.

The Chinese Medical Journal prior to 1967 contains a number of papers related to various parasitic diseases, particularly amebiasis, schistosomiasis, clonorchiasis and malaria. Several of these are quite interesting. Beginning in 1967, this journal became largely a vehicle for papers related to Mao's thoughts and leadership through medicine, without presenting specific public health information as to the extent of these infestations or broad measures of control.

With respect to schistosomiasis, there have been voluminous and repeated reports in the Chinese press and popular magazines concerning the irradication of snails which harbor the parasite. In 1958 Mao initiated a massive campaign against these snails. The snails were destroyed by filling in ditches and ponds, by applying a preparation from the seeds of Thea Aleosa in the rice fields, by digging new water courses and irrigating ditches. Additionally, medical teams were designated in each township for the treatment of schistosomiasis. Primary treatment provided was tartar emetic. Traditional medicines were also used. From some popular reports one would gain the impression that the problem of the host snail has been eliminated, but this seems not to be the case since periodically there are reports of renewed campaigns against it.

Reacting to informal comments made prior to the opening of this session concerning visits to the PRC, I doubt that we as Americans are going to be able to visit China with preplanned programs for elaboration and data sheets for information, and be able to bring out data desired.

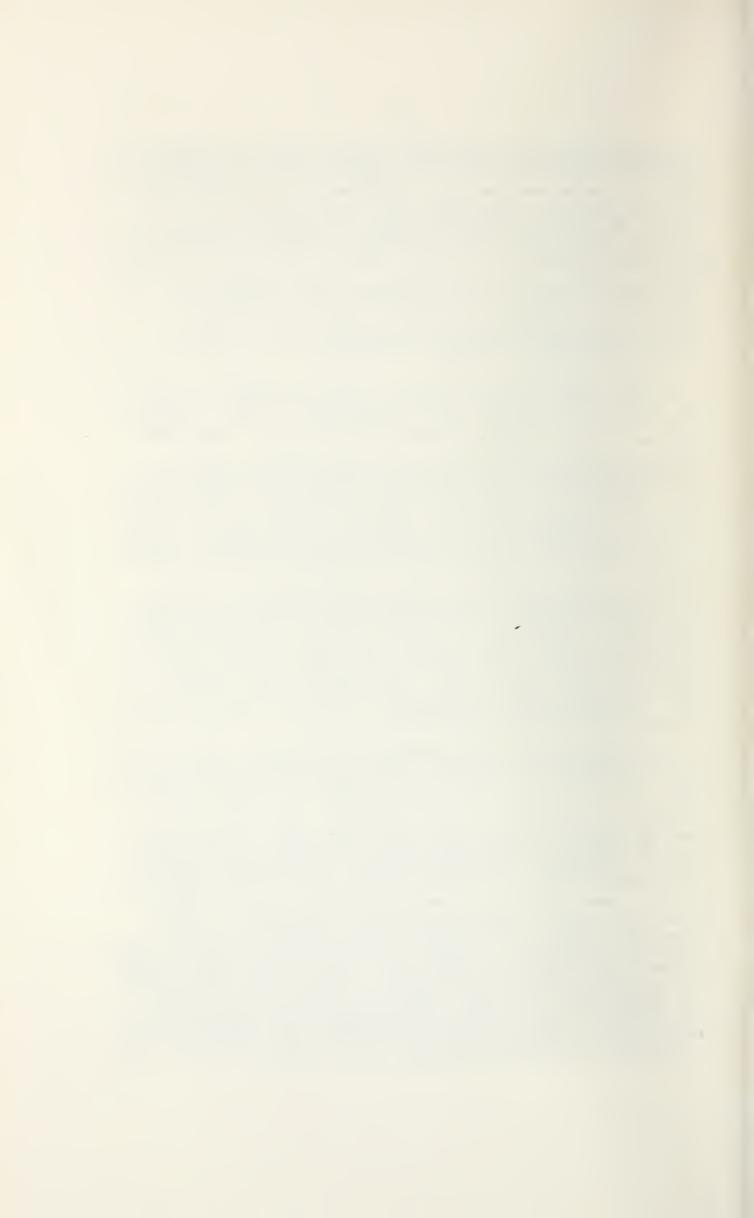
What must be recognized is the tremendous new feeling of pride in the country and its achievements. Attention by potential medical visitors to China to prior medical history, an attitude of wishing to learn what they know of disease, and to collaboration as equals will be the necessary approach. In this country we have a very limited knowledge of China. Even in this august group of persons interested in Chinese medicine, very few know any proverbs or common sayings rife among the Chinese relating to medicine. Despite our prior long history of medical missions in China, very few of our potential visitors

will know anything about where these mission hospitals were or who built them. The same holds true for medical schools. Uninformed visitors in being shown such institutions may well assume that they are all part of recent developments and not be aware of their prior legacy. We need not only an enthusiasm for a discovery of what is currently going on, but we need the patience to develop a background of knowledge which will permit rational respect and rational evaluation.

Dr. Gerald F. Winfield, who is the Associate Chief, Manpower and Institutional Development Division of the Office of Population of the Agency for International Development, offered the following comments concerning the relation of sanitation habits to certain infectious and parsitic diseases:

I don't consider myself up to date on schistosomiasis. My job has taken me in different directions for the last 20 years. However, I am very much interested in what is happening in the area of household sanitation. In watching television, for instance, I have noted that many children in north China are still wearing split pants. This perhaps means that small children's defecation habits may not I would like to know to what extent this is true. have changed much. Their pollution of the household is the major cause of Ascaris infec-I see the prevalence of this parasitic disease as only the tip of the iceberg of the sanitation situation out in rural areas. These are the things I would like to see given attention. The distribution of night soil in the country is one of the more slowly changing customs but easier to get at in terms of disease control. I would be very much interested in any changes in actual methods of handling Information I have received from friends indicates fecal material. to me that in North China, for instance, they are still drying human feces into fertilizer cakes around all the cities and handling it very much in the same way they did in the 1940's. From my point of view I think this is not all bad. I don't think there is enough water in China to provide for water borne sewage, nor is there money to put in the required sewage systems.

On the question of schistosomiasis, my impression is that 3 or 4 years ago there was a massive propaganda effort in favor of snail control. In Chinese publications there were many articles and pictures that children with sticks were out killing snails. I gather that this program has not been particularly successful. I would doubt that it would be successful because this snail is very small. It is an amphibious snail. It lives 2 inches above and 2 inches below the water level. It hides and is very hard to find. One has to know what one is looking for. One has to search for it and to find its natural habitat. Many could escape no matter how massive the effort, especially when untrained people are looking for the snails. I gather also that it has not been successful as the subject has virtually disappeared from the news, in comparison with the volume of material on the subject that we read 3 or 4 years ago. The subject has been replaced by acupuncture anesthesia and neoplastic surgery in the news, so that its disappearance is striking. Another point deserving of special attention in relation to infectious diseases is the effect of China's massive health education program at the school level in teaching sanitation and hygiene to children.



SEVERE TRAUMATOLOGY RESEARCH

Fogarty International Center Staff Comments:

As a result of attempts during the 1958 Great Leap Forward to rapidly establish small steel production and other industrial units in semi-rural areas, without the use of proper engineering and safety personnel, many inexperienced workers suffered massive second and third degree burns, and the complete severance of limbs. prompted serious research during the early 1960's on methods for successfully treating the burns and for the reattachment of severed limbs. By the mid-1960's numbers of successes were reported in both Little has been said by the Chinese, however, on the followup of patients who survived third degree burns over 70 percent or more of their bodies in terms of their performing useful roles in the economy, but much has been said and demonstrated on the follow-up of successful arm and leg reattachments. Burn therapy appears to utilize a mix of Western and traditional Chinese techniques, but limb reattachment appears to have as one of its principal techniques a better method for the anastomosis of small blood vessels. Traditional Chinese exercises, however, appear to play a significant role in returning an adequate degree of mobility and usefulness to the reattached limb.

The reportedly successful treatment of massive burns and the reattachment of completely severed limbs appear worthy of examination in depth. Details of the development of the research programs and of the techniques associated with both projects should be studied to see what application they may have to similar problems in the West. It may be of further interest to learn if the Chinese have developed other surgical and medical innovations applied to trauma.

Dr. Bowers introduced Dr. Francis D. Moore, Head of the Surgery Department, Peter Bent Brigham Hospital in Boston. Dr. Bowers mentioned that Dr. Moore has written a very good book called, Give and Take, which he felt sure many of the participants had read. Dr. Moore made the following comments on surgical advances and research, including burn surgery and limb reattachment.

I think that many of us here feel that we are drinking from a well of ignorance and my disclaimer joins others of you who do not have first-hand knowledge of China. I have never been to China. My travels have been in India, Thailand, Korea and Japan. We have had many students with us from the Far East, many of them brought here through the interest of Dr. Bowers, especially from Korea, Japan, and Taiwan.

I would like to start out by saying that I think we should question very seriously the concept of something basically different between traditional and so-called Western medicine in China. That is a distinction that arises in our minds and in Chinese presentations. Actually, Chinese traditional medicine grew up over 2,000 years ago in a very advanced and literate civilization. They developed

manipulative skills and herbal remedies which they studied and used in a sophisticated way. They published an extensive pharmacopeia in 1578. They introduced inoculation against smallpox in 1515. It wasn't introduced in this country until 1717 and we are speaking of inoculation, not vaccination.

They had a steady development of their own traditional medicine as we did in the West. In a large urban hospital anywhere in this country, digitalis is given every day. We don't refer to that as "English rural traditional medicine" while the patient in bed with intravenous chemotherapy is receiving "Western medicine."

One is an ancient herbal remedy first identified from rural custom in England but now used widely for heart disease. The other is a synthetic chemical. This differentiation is clearly an artificial one.

The real issues are, are the things that they do effective? Secondly, do we understand them? In Chinese presentations they like to emphasize their traditional medicine because they feel overtaken by the great mushrooming of Western technology. They therefore defend their own situation. From their traditional medicine came our iodine, kaoline and other medicines we use.

In approaching Chinese medicine and making this differentiation we are deluding ourselves. We would do much better to study in more detail what they do. The public media are the worst offenders. They often confuse Chinese traditional medicine with simple witchcraft. Much of it was developed in continuity in a very highly enriched civilization, with a system of checks and balances, looking at what was done and selecting the things that were good. Even that herb in the muscle relaxant that we use every day! So I don't see any reason yet to differentiate traditional versus Western medicine.

Secondly, particularly in surgery, you have got to be aware of the anecdotal approach. A story of a large burn, 90% that got well, for example, makes a great adventure of a single case. Any surgical event leads itself to the anecdote. Spectacular and recent events in heart transplantations demonstrated that we can fall for the same sham. If we do, we have not learned anything. We have seen the famous picture of a Chinese surgeon demonstrating on a gourd how he was going to perform an operation. There was also a picture of a large tumor that reportedly was subsequently removed. I guess we all realize immediately that it weighed more than the patient! Now what do we learn from that? Just exactly nothing. The removal of large ovarian tumors has been done by surgeons for many years and is commonly done today. The problems are to be analyzed in the aggregate: accessibility, indications, results and training.

The reimplantation of limbs falls into the same category. If the Chinese are very good at it, it is because of practice: they have a lot of limbs to replant. Why are they all being cut off? They are being cut off because of a lot of unsolved problems in industrial hygiene in which this country and others in the West are a little more advanced. And yet the limb reimplantation procedure is interesting and it is so common over there that everybody knows enough to cool a limb and keep it clean. This is a part of the

wonderful public education in China, this mixing of politics with public health.

If we stood for the abolition of prostitution and premarital sexual intercourse in this country (as the Communist Party does in China) we would do away with syphilis and gonorrhea. As you know, gonorrhea is one of the commonest of all diseases in this country and the conquest of syphilis in China was due to abolition of prostitution. The Chinese are not above exaggeration. When they show a picture of an arm that has been completely removed, has been resutured, and the man is playing the piano the next week, you know even in China you can't abrogate biology. Mixed nerves grow one millimeter per day in China just like they do in this country. Any real use of a completely severed limb requires months and years of a neurologic regeneration.

Some years ago in Russia they were interested in reattaching severed animal heads, and cutting off animal's legs and putting them back on. All of us in the meeting here were treated to a movie of an animal that had its leg completely cut off and sutured back on again. Yet it was running around and all four legs were working well a few days later! The professor came to visit with us a few months afterwards. He said that even in Russia they have newspapers too.

In traumatology in this country our emphasis at this moment is on preventive public health. The whole emphasis is on automobile-induced trauma. It has to do with vehicular design and we should declare it illegal and immoral to drive while drunk. In China they don't have many automobiles, and if they did, they wouldn't permit people to drive while intoxicated.

It is interesting that the Chinese are interested in burns. In this country most burn epidemiology is in the middle south, an example of geographic pathology. In New England we are so used to heating our houses that we don't set them on fire every time there is a frost. In the deep south they seldom heat their houses. But in the middle south the poorer people living in the country, when there is a bad frost, take gasoline to start a fire and there is an explosion.

We have already mentioned antibiotics. Volume blood replacement occupies a great interest in this country and the Chinese have simply taken over our methods, lock stock and barrel. Blood transfusion and the preparation of plasma and plasma expanders are really no different there than here. In this country we are interested in monitoring, that is, in minute-to-minute surveillance through sophisticated means including large computers, for providing very detailed information on critically ill and post-operative patients. The National Institutes of Health have invested millions of dollars in that all over the country. It is a rather typical American development, very technological, very electronic. Is a million-dollar computer better than a nurse? I doubt it. But in some instances it might make it possible to take care of lots of patients at once. That is why the Armed Forces are so interested in computer monitoring. I am sure the Chinese are not interested in it. It is a terribly expensive luxury.

But for all that they do, the issue is not "traditional" versus "Western" medicine, but rather, is it effective, why is it effective, and do we understand it?

For these reasons there is absolutely nothing that is even in the same category with acupuncture anesthesia. I have talked to people who have used it. It appears to be <u>effective</u> and we do not understand it. To be able to do an operation on a patient without the tremendous stress and biochemical deficit of a drug given to him to the point of insensibility would be a great leap forward. I have to keep reminding my anesthetic colleagues that they are the only people who use drugs to the point of a coma. If we could get away from that it would be a wonderful thing!

Some acupuncture also involves the injection of local anesthetics. Some involve the application of electrical current. Both of them we use and understand. But the "pure" acupuncture of one area with satisfactory anesthesia in another -- this is what we need to know more about right away!

4. SCIENTIFIC BASIS FOR TRADITIONAL MEDICINE

Fogarty International Center Staff Comments:

Traditional medicine in China is founded on an ancient concept of opposing cosmic forces. When these forces are in balance, the individual is healthy. When the forces are out of balance, the individual falls ill. This philosophical theory is quite foreign to modern Western thinking, and since traditional medicine was never subjected to scientific investigation prior to the establishment of the People's Republic of China in 1949, its practices remain largely obscure in the minds of Western medical scientists. With the sudden and much publicized advent in 1971 of acupuncture anesthesia, Western imagination has been captured and the whole pantheon of traditional Chinese medicine is now before us.

Traditional Chinese medicine, for the purpose of this meeting, can be considered from the point of view of its two major divisions, herbal medicine and acupuncture. Herbal medicine utilizes often complicated mixtures of plant and animal decoctions that generally are taken orally. While many of these mixtures appear to fall into the category of laxatives and diuretics, some, like Rauwolfia and Ma Huang (ephedrine) have clear pharmaceutical activity. Acupuncture consists essentially of inserting fine needles into highly specific points on the body surface where different arrangement of efficacious points exist for each disease syndrome or disorder. Proper needling is said to restore the balance of the cosmic forces whose imbalance has produced the disease syndrome or disorder.

Of the two major discussions of Chinese traditional medicine, acupuncture now occupies the position of greatest interest in the West. This is due to recent demonstrations before U.S. visitors of Chinese surgical anesthesia produced through a recently developed acupuncture technique. At this point no one, including the Chinese surgeons, can offer a sound scientific explanation for the anesthetic effect. In this connection, acupuncture as applied to the treatment of disease must be clearly separated from acupuncture anesthesia. The former is necessarily non-subjective since it appears to produce an immediate and profound effect.

Dr. Bowers introduced Dr. E. Grey Dimond, Provost for Health Sciences of the University of Missouri to discuss acupuncture and acupuncture anesthesia. Dr. Dimond's remarks follow.

Dr. Moore mentioned two articles which I wrote in the Journal of the American medical Association. As with any author, I am replete with reprints. In those two articles* I pretty well wrote all I know

^{* (1)} Medical Education and Care in the People's Republic of China JAMA 218: 1552-1557, 1972

⁽²⁾ Acupuncture Anesthesia. JAMA 218: 1558-1563, 1972

about Chinese medicine. I would like to update those, if I may, by other experiences I have had.

Chinese contacts that I have had say you cannot separate politics or political intent from data. They maintain that they do have a census of their lepers. They have them identified. I am simply repeating what has been said. Schistosomiasis is definitely present and is still a problem but they do feel that they have contained it. Villages are no longer noted for large liver or respiratory insufficiencies, but there is still an endemic schistosomiasis problem. They have put high school and college trained teams out into the canals with buckets. Each member of a bucket brigade is given so many merit badges for the number of snails they bring in at the end of the day. They are all having some education as they work. In terms of national health problems, respiratory disease was declared by the government as national health problem number one. At the National Institute Materia Medica a crash program of research is to determine why there is so much respiratory disease.

Dr. Bowers:

Is that more in north China than in the South?

Dr. Dimond:

I can't say, John, I don't know. It has been declared a national problem. I asked if it was the burning of wood in the homes, and if it was due to smoking cigarettes, which is a national endemic problem. They denied that they are studying smoking. I saw six women in one day, at a 200 bed hospital, and they showed me the data on 90 cases of thrombosing disease of the aortic arch which we see rarely. Rheumatic fever is very prevalent -- an interesting point. As prophylaxis for rheumatic fever they occasionally use penicillin or an herb. In that same vein, for acute appendicitis 90% of the cases at one commune hospital are treated by oral concoction with only perforated appendices operated upon. In those 90% treated by the oral concoction, they claim an 80% success rate without surgery.

I had the opportunity to talk to a leading Chinese cancer expert. Cancer of the esophagus, cancer of the stomach, and cancer of the liver are their great cancer problems. He knows of no herb which is useful in this. He does feel that they have a greater extension of margin of safety for chemotherapy, by using herbs at the same time. He does feel that there are herbs which when given will aid one's nutrition in the presence of cancer.

Thyroid disease is operated upon, almost entirely (99%) with acupuncture anesthesia. That kind of statement deserves anyone's attention. Surgery from the diaphragm down has a low order of effectiveness under acupuncture anesthesia, because it is difficult to get muscle relaxation, and difficult not to have traction pain from the abdominal viscera. It works well for limb surgery, chest surgery. As to why it works, an article in Science offers a possible mechanism. Not specifically referring to acupuncture anesthesia, the article suggests irritating the skin for continuous periods may cause a "gate closing" effect on pain levels in the cord. That article and

subsequent articles, two weeks ago put into the "Letters to the Editor" of JAMA, may give a clue as to some possible explanations for acupuncture anesthesia.*

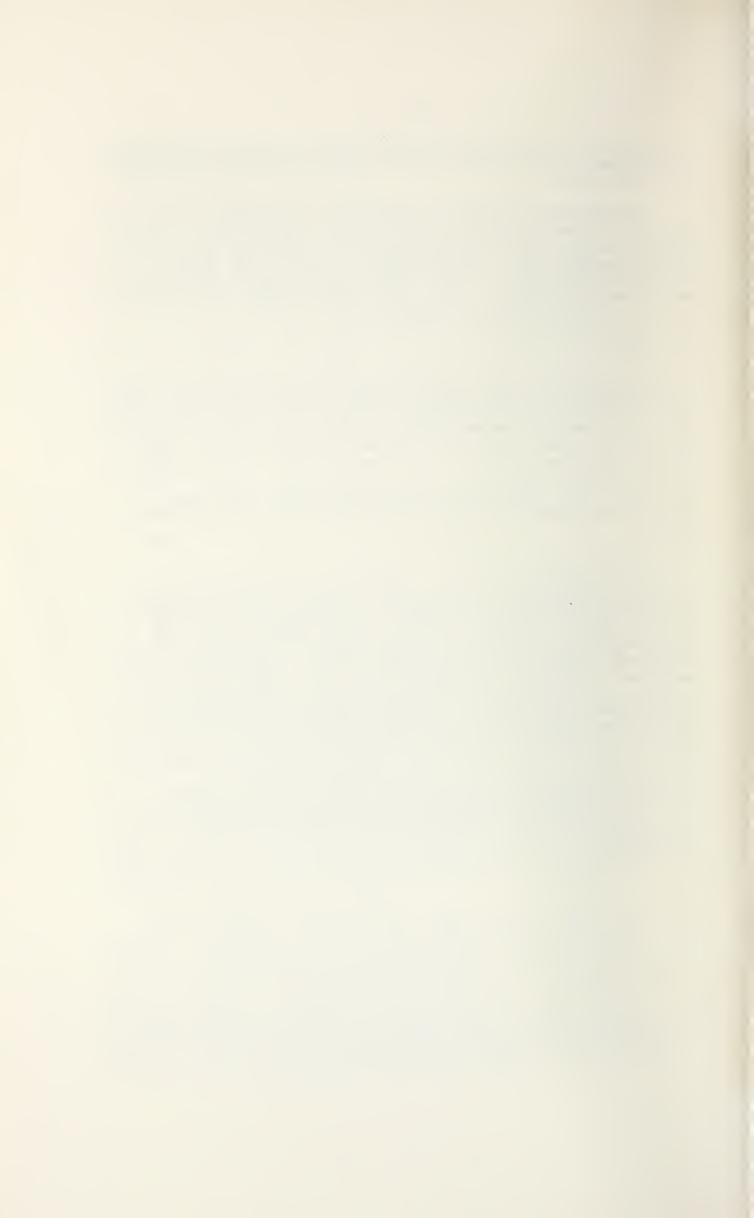
You know when Mao took over, there was an army made up of peasants. He promised them Utopia. What can you offer people who have nothing? You promise them food and clothing and to get rid of the pests. You give them enough to eat and keep them warm, take care of the basic things that are destroying them. Those things he could only accomplish by reordering priorities. Delivery of health care was a top priority. In their own way, they have accomplished this.

Dr. Bowers:

There was an article, published in Shanghai, that was translated by the news agency at the Consulate General in Hong Kong, which claimed the two things they are doing that are different, in anesthesia, involve the use of electrodes and of rotating needles. These new techniques plus the insertion of the needle provoke a neurophysiological sleep stimulus which was sufficient to obliterate the pain stimulus from the site of surgery. They had no charts, grafts, data, nothing. This is the latest that I have read of any scientific effort and I wonder if you had any information as to where they were actually doing research on it?

Dr. Dimond:

Primitive research is being done under difficult circumstances at the teaching hospital in Peking. At the Peking Medical College, the Department of Acupuncture in the medical school is doing quite crude research in the following areas. They are stimulating areas of the ear and measuring electrical potentials over various parts of the body, and, in doing so, laying out a chart. For example, an area in the ear, when stimulated, would produce electrical impedence change over the area of the stomach. The Department of Neurophysiology in the same institution is also measuring electrical effects on the brain of cats by stimulating the nerves such as tooth nerve. Acupuncture anesthesia is then carried out, showing a blocking of the stimulus from reaching the brain. Another study being done by the anesthesiology department in the Peking Medical College teaching hospital, which may be a clue, is that, if you widely infiltrate the area where the needle is inserted with an anesthetic agent, it is ineffective.



5. RESEARCH AND PRODUCTION OF PHARMACEUTICALS

Fogarty International Center Staff Comments:

Pharmacological research and the production of pharmaceuticals is closely linked with Chinese health campaigns and, as such, has enjoyed a high priority since the first five-year plan. By 1958, China was producing most of the common antibiotics and biologicals, and active research was in progress on new drug development. Both the quality and quantity of pharmaceuticals production was found wanting, however, and foreign imports made up a substantial amount of the total available supply. During the period 1961-1966, both the quality and quantity of Chinese produced pharmaceuticals improved, but quality control was still questionable. Population gains tended to render quantity increases inadequate. The industry was further hampered by shut-downs during the Cultural Revolution and only now appears to be recovering the pre-1966 production capability.

Biologicals fared somewhat better during the same periods with serums and vaccines of acceptable quality being mass-produced, and mass-inoculation campaigns carried out.

During the same period research was being performed across the board on new Western-style medicines and on discovering the active principles in traditional preparations.

Areas of potential interest to Western medicine include: the search for anti-cancer drugs, both Western-style and traditional; development of vaccines against Japanese B encephalitis and trachoma; development of long acting contraceptive preparations; the development of better quality control measures for antibiotic production; and innovative methods for generally increasing pharmaceutical production so as to reduce reliance on foreign imports.

Dr. Bowers next introduced Dr. James Y. P. Chen, Director of Medical Research, California Medical Group. Dr. Chen discussed research and production of pharmaceuticals.

Mr. Chairman, Ladies and Gentlemen. I don't wish to use too much time going into the history of traditional Chinese medicine as it was covered adequately this morning. I will go directly into the pharmacological and pharmaceutical achievements in China today. Significant achievement in modern pharmacology has been reported in recent years by Chinese health authorities as well as by Western scientists and physicians who have been recent visitors to the People's Republic of China. These new developments, along with growing curiosity about acupuncture and herbal medicine, account for the recent increase in interest in Chinese traditional medicine. To promote research and training in this subject, the Academy of Traditional Chinese Medicine was established in Peking in 1955, which would also

serve to coordinate research on acupuncture and Chinese traditional remedies. Subsequent integration of traditional and Western scientific schools with government encouragement in 1958 resulted in extensive examination and development of traditional medicine through modern scientific methods. The Academy in Peking, which was recently visited by American physicians and scientists, including Dr. E. Grey Dimond, is a component of the Chinese Academy of Science. It has a Department of Pharmaceutical and Chemical Synthesis, Department of Physiochemistry, Department of Pharmacological Analysis and Department of Pharmaceutical and Pharmacological Research. Here medicinal herbs used in traditional medicine receive scientific analysis, leading to further development of pharmaceutical technology. Through these efforts many important plant drugs have been identified and isolated, although to date no outstanding drugs have been reported from herbs. At the same time, the pharmaceutical industry has kept pace with modern technology including drug synthesis. Of particular significance is the successful synthesis of insulin. In consonance with the national drive to increase agricultural productivity, emphasis was placed on the development of such drugs as antibiotics for the problem of chronic bronchitis, common colds, influenza, etc. Chinese herbs are economical and are regarded as being very effective in rural and industrial medicine. Numerous "secret" formulae in the last two years have been collected and studied by scientifically trained doctors in research institutes in order to learn the basic active ingredients. A number of these have been isolated and proved quite effective.

I will mention briefly some of the more significant achievements, first drugs against parasitic diseases.

Nationwide campaigns were conducted for the eradication of five major parasitic diseases in China, namely, schistosomiasis, malaria, filariasis, hookworm and kala-azar. Of these prevalent diseases, the greatest emphasis has been placed on schistosomiasis as indicated by the abundance of literature on new and effective antischistosomal compounds. Of the new drugs synthesized and screened I would like to mention two recently discovered non-antimonial compounds, coded by the Chinese as F30066 and F30069, which are a nitro-furan type and reported to be effective oral anti-schistosomal agents. Among the Chinese herbal remedies, Cucurbita pepo (pumpkin seeds) and wild day-lilies were found to possess definite therapeutic effects in experimental and clinical treatment of schistosomiasis. The effectiveness of pumpkin seeds was said to be enhanced by the concomitant use of antimonial compounds. Pumpkin seeds were claimed to be more stable and more effective than antimony potassium tartrate.

With regard to other parasitic diseases, in vivax malaria a radical cure was achieved in a large number of cases treated with primaquine combined with chloroquine, or cyclochloroguanide, a new synthetic drug. In the controlled group given chloroquine alone, there was a relapse rate of 50%. Of the medicinal plants Orixa japonica and Brucea javanica showed a significant anti-malarial activity in experimentally infected animals. You have all heard, I am sure, that during the Second World War extensive pharmacologic studies were carried out both in China and the United States on Chang-shan (Dichroa

febrifuga 1.), a well known Chinese anti-malarial medicinal plant which proved to be very effective in experimental malaria (in ducklings). However, it is also quite toxic.

The combined use of pumpkin seeds and areca nuts were claimed in several reports to have been found highly effective in the treatment of tape worms. The pumpkin seeds were found to paralyze the cephalic half of the worm, that is the head, and the areca nuts were found to paralyze the caudal half, that is the tail of the tape worm. Also of interest is a report on the efficacy of hexachloroparaxylol in the treatment of human cases of fasciolopsiasis buski.

Now I will mention herbal drugs which were found effective for the nervous system. Corydalis ambigua is a commonly used Chinese drug for pain. Corydalis b. has a definite tranquilizing effect, and it acts on different part of the brain. Its analgesic and tranquilizing effects have been attributed to its levoglucose content. It was also found to stimulate the secretion of ACTH.

Cardiovascular drugs were studied quite extensively for their hypotensive effects. Rauwolfia verticillata grows in south China, including Hainan Island, which is also in south China. Several active ingredients have been isolated and some have definite hypotensive activity. Another herb, Clerodendron trichotomum, traditionally used in China for headaches, rheumatism and other rheumatoid ailments have been found in recent years to treat hypertension. Three active principles of this plant have been isolated for study of their hypotensive effects. Another interesting report is that on the study of a new alkaloid, liensinine which is isolated from the green center (embryo) of the seeds of the Asiatic lotus, Nelumbo nucifera.

Of the anti-bacterial drugs from the Chinese traditional herbs, Coptis chinesis f. has been studied quite extensively for all kinds of anti-bacterial activity including that against dysentery. Berberine is one of the most active alkaloids studied. Pai-ku, which is the seed of the plant Ginkgo biloba 1. is a folk medicine in China for relieving chest congestions and for the treatment of tuberculosis. Its active principle ingredient, Pai-ku hydrochloric acid, has been found effective in arresting tuberculosis in animals. However, there have been no clinical reports confirming its effect against tuberculosis in man. I know in China this is a folk medicine for tuberculosis. The Ginkgo nuts are usually soaked in vegetable oil for about six months and are then eaten for tuberculosis.

Other drugs, like Leomurus sibiricus, are popular postnatal herbal medicines. Several of its alkaloids have been isolated and proven effective uterine stimulants. Angelica sinensis is another very popular Chinese herbal medicine for all kinds of female disorders, such as menstrual disorders, abnormal bleeding and postpartum bleeding and has been proven effective in conditions such as dysmenorrhea, anemia and general debility. I tried it in at least two cases and found it quite effective in stopping excessive menstrual bleeding. Glycyrrhiza glabra (licorice) was found to have cortisone-like properties. I don't want to go into all the details, but this has been used in a variety of disorders including Addison's disease.

I should also mention in connection with schistosomiasis one new effective agent against <u>S. japonica</u> snails, coded as "FUHWA-203." This new organic phosphorus insecticide was found to have effective lethal action on the oncomeliania snails.

Regarding biological agents, all common antibiotics and biologicals currently used in the West have reached the production stage in China today. The emphasis is on prevention of communicable diseases. Considerable efforts have been made toward the development of vaccines for the treatment and prevention of Japanese B encephalitis, influenza and trachoma, which are quite prevalent in China. Vaccines against measles, influenza and yellow fever, as well as sugar-coated freeze-dried polio vaccines have been produced. It should also be noted that Chinese scientists were the first in the world to achieve total synthesis of a biologically active protein crystalline bovine insulin - by chemical method in 1965. Two groups of Chinese chemists at the Institute of Biochemistry, Academia Sinica, and at the Department of Chemistry, Peking University, completed this research project after four years of effort. This of course is a very significant contribution to basic research, signalling the beginning of an era of synthetic proteins.

As to the pharmaceutical industry, the Chinese have kept pace with the development of all industries in the country. Following 20 years of perseverance and self-reliance, the pharmaceutical industry has changed from one for reprocessing imported drugs to a completely self-sufficient manufacturing organization. Today drug factories of varying sizes are present in every province and autonomous region. Production has been increasing steadily especially of antibiotics, vaccines and antipyretics. Modern pharmaceutical tech-.niques such as chromatography, electrophoresis, fluorometric analysis and stereochemistry have been employed in research and development. Although they have had minor setbacks, quality control standards have been formulated and improved in recent years particularly for herbal drug production. In China today the people don't take herbs and medicines in the old traditional ways. The herbs are now prepared in modern pharmaceutical forms such as powder, capsules, ampules etc. The processing and preparation of traditional drugs in the farm villages has been greatly advanced. With improved drug manufacturing techniques liquid drugs are made more stable resulting in considerable improvement of drugs for injection.

Means of using natural resources have also been emphasized. For example, substitutes have been found for Arabian glue and cocoa beans. Studies have been conducted to improve the ointment base in the manufacture of contraceptives. New machinery and effective work methods have been developed. Antibiotics factories have been built in various regions of China. Equipment such as fermentation tanks, conditioning apparatus, measuring apparatus, air compressors, ultracentrifuges, etc. can be found of Chinese design and production. Factories built in recent years have reportedly used no foreign equipment. Increased production of antibiotics demanded additional quantities of lactose for fermentation which was found to be too expensive. Instead, corn flour, which was inexpensive and plentiful, was first suggested as a substitute in 1958 by Professor Chang Wei-shen of the Peking Biological Research Laboratory. Experiments with corn flour also led to

the successful use of molasses and glucose which China produced in large quantities.

China manufactures considerable quantities of a great variety of antibiotics in current use; streptomycin, auremoycin, chloromycetin, tetracyclines and the newer semisynthetic penicillins. The development of antibiotic production has contributed to the promotion of industrial microbiology. Notable achievement has been made, for example, in the fermentation of amino acids and vitamins and in the microbial oxidation of steroids. Industrial biochemistry can be expected to become one of the most important scientific developments for the national economy. It should be pointed out that in China today, the intensified use of antibiotics is not confined to medicine. They are also used in agriculture and stock raising.

Since 1957 the price of penicillin, as in this country, has been markedly reduced with regularity. A wide range of antibiotics is manufactured in China and is presently available in large quantities. Surpluses are available for export to other Asian, European and South American countries.

Some mention should be made of certain practical rural medicinals which may also be edible foods. These common fold medicinals in China have been found to be simple, economic and effective. The more common remedies are as follows: (1) Loaches: They are a kind of eel, commonly found in ditches and water bogs. The mucous secretion of the eel is used for acute infections of the skin. It is claimed that it is more effective than any of the antibiotics available in the countryside. Apparently the secretion contains some antibiotics or some kind of enzyme. There are a number of reports on the effectiveness of this crude secretion from the skin of this particular kind of eel. (2) Earthworms: An extract of these worms has been found to have hypotensive and bronchodilating effects both in animal experimentation and clinical use. (3) Grasshoppers and locusts when used medicinally have a definite effect on the common cough, particularly whooping cough, and are also highly nourishing. They are about 64% protein. I would now like to show some slides illustrating how the farmers are encouraged to grow and to collect medicinal plants and to breed medicinal animals. This is a slide showing how young people are taught to grow and collect various varieties of medicinal plants which help the people in this area. As you know, there are many minority racial groups in China. This slide shows a village in Southwest China, where people are taught to search for their own folk medicine. The older people teach the collection processing and use of these herbs. The knowledge is passed on to the younger generation. The next slide shows a medicinal plant, Aster tartaricus, which is claimed to be effective in treating cough. It is grown in different communes. This commune is near Peking. This slide shows another commune near Shanghai. The commune workers collect the herbs and store them. They are then processed for local use.

The next slide shows a Sika deer. The Chinese believe in the therapeutic effects of animal horns, particularly the antlers from the deer. The collagen of its antlers is believed to be effective in promoting various body functions, treating weakness of heart muscles and hastening the healing of wounds. Deer-raising has developed

rapidly in China in the past few years. The people are encouraged to submit to the government all kinds of so-called "secret" prescriptions. I received two herb books just two days ago from a friend in Los Angeles who recently returned from a visit to China. These were recently published with excellent color photographs of many medicinal plants and descriptions of their use.

Dr. Bowers:

Thank you very much Dr. Chen. Are there any comments or questions that anyone would like to make on this question of the adequacy of pharmaceutical products in China? Then I gather that there is no need for the Chinese to import medicine.

6. NUTRITION

Fogarty International Center Staff Comments:

Food availability versus population increase poses one of China's most fundamental problems. Given a limited and uncertain food supply, nutrition becomes of paramount importance in order to make the greatest use of available foods. The efficiency of the labor force and of the military are at stake, and this provides strong reason for China's emphasis on agriculture over heavy industry.

During the post-Leap Forward period 1959-1961, a series of poor crop years made nutrition a principal problem. The efficient organization of the central government, however, resulted in a system of food distribution that averted mass starvation and replaced it with mass malnutrition. The problem involved both total caloric intake and the nutritional balance of the diet. The presence of a great deal of liver disease attributed to malnutrition (but often miscalled infectious hepatitis) spoke for serious choline and methionine deficiencies.

Chinese nutritional research was begun early in the 1950's. Most of the work involved the determination of the nutritive value of common Chinese foods, and of the composition of nutritionally optimal diets using those foods; a search for new food sources, particularly from the sea; and on optimal methods of food preservation and the prevention of contamination, including the use of radiation techniques.

Dr. Bowers then introduced Dr. Olaf Mickelsen, Professor of Nutrition and Biochemistry at Michigan University who presented the following discussion on nutrition.

Nutritional disturbances resulting from a critical shortage of food have been Mainland China's major, continuing health problems for many years. The quantity of food available to each inhabitant of that country has been little more than that required to avoid starvation. This constant and continuing shortage of food has had an important impact not only on its politics but also on almost every aspect of Chinese life.

The crucial relation of the nutritional situation among the Chinese people to their health problems was emphasized by Snapper (1965, p.~9). After many years experience with Chinese medical problems as seen at Peking Union Medical College, he stated that "the most important thing for the newcomer to study is the food situation of North China because this condition influences the clinical picture of nearly every disease." This situation may not change very drastically according to May (1961) who claims that "China will remain for many years

shortages and inequities of food" (Borgstrom, 1972a, p. 110), thus helping to avert famines despite local food shortages.

The critical nature of the food supply is suggested by the fact that there are reportedly no dogs in China. This situation so impressed Kinmond (1957, $p.\ 163$) on a trip to China that he asked his interpreter for an explanation. The reply was that "They were all killed when the U.S. started germ warfare in Korea. We found the dogs were carriers of the germs so we had to destroy them. It was a difficult decision to make because we Chinese like dogs." Essentially the same story came from an information officer in the Chinese Foreign Office in Peking.

For China, any evaluation of the nutritional condition of its people is intimately dependent on the yield of each year's crops. With the major portion of the people engaged in agriculture and that primarily of a subsistence nature, there is very little carry-over from year to year (Snapper, 1965, p. 9). One reason why there is so little carry-over is that "the Chinese farmer is so close to the poverty line that he reflects a poor harvest immediately by eating less and a good harvest by eating more" (Dawson, 1970, p. 12). This situation is not so prominent among the urban dwellers since the imported food was available almost exclusively in the major cities (Eckstein, 1967, p. 172). Most of these cities are on the seacoast or on rivers sufficiently navigable to accommodate large ships.

To augment its food production, China, for the past 20 years, has reclaimed large tracts of waste land and brought them into agriculture production. Large portions of this land have required irrigation. According to Borgstrom (1972b, p. 2) the land thus reclaimed has amounted to 100 million acres. The critical factor in China's food production is water. Although there are many large rivers in that country which could provide adequate water for "all agricultural, industrial and civil uses in spite of the growing population...Unfortunately the geographical distribution of this huge body of water is highly uneven in relation to the nation's cultivated and cultivable areas" (Dawson, 1970, p. 69). Approximately 76 per cent of the water is in southern China which has only a third of the country's crop land. The northern and especially the northwestern part of China with its 51 per cent of cultivated land has only about 7 per cent of the surface waters. Attempts have been made to regulate the flow of water in the northern rivers by a series of dams. These have been only partially successful and, for some of them, their usefulness may be limited. The large amount of silt in many of China's rivers has reduced the capacity of some of the recently built dams (Dawson, 1970, p. 71). One example of the acuteness of the water shortage for agricultural purposes is the report that the Chinese "have had to resort to such desperate measures as using airplanes to scatter soot and ash on the glaciers, thereby affecting the melting of the ice and multiplying the runoff to the rivers feeding the dry plains below" (Borgstrom, 1972a, p. 119).

It seems almost incongruous that in some of the regions of water shortage, large tracts have been so water logged they were not suitable for agricultural purposes. Within the last few years, drainage canals have been installed and dams built to protect the land from reflooding. As a result, approximately 8.2 million acres have been brought into cultivation (Washenko, 1972).

There is no questioning the fact that China has made great strides in improving its food production. This was maintained even during the Cultural Revolution when reports indicated that Peking kept rural areas out of the "rebel movement" (Dawson, 1970, p. 188). The improved food production has resulted not only from the increased land brought under cultivation and the steps taken to conserve water for irrigation purposes but also from increased fertilizer use and the adaptation of improved plant varieties. Chemical fertilizer production in China increased from 140,000 tons in 1932 to 800,000 in 1957 and to 10,400,000 tons in 1967 with a slight decrease in 1968 due to the disruption associated with the Cultural Revolution (Dawson, 1970, p. 122). The major form of fertilizer used in China continues to be human and animal excrement. The latrines for the collection of urine and feces are reportedly inhabited by pigs (Scott, 1952, $p.\ 137$). By adding to the latrine plant refuse and a minimal amount of feed, the pigs are able to grow to marketable size. Although this procedure as well as the chemical treatment of the latrine contents will reduce the microorganisms and parasites infecting human beings, the absence of public health statistics makes it impossible to evaluate the effectiveness of these measures. There are suggestions that the soil in most of China is so heavily infested with parasitic eggs that even in 1960 this accounted for the report that nine-tenths of the peoples in rural areas were infected with tapeworms (Borgstrom, 1972a, p. 128).

This method of raising hogs apparently has been adopted on a large scale in China, since hog production has increased to the point where the number of these animals in China exceeds those in the United States (Borgstrom, 1972b, p. 2). Hog production in China is a family operation; presumably, there are no large-scale swine farms. These are not likely to be developed as long as the primary basis for hog production continues to be "pork from waste" (Winfield, 1948, p. 65).

Besides pork, poultry and eggs are the primary sources of animal protein in the Chinese diet. Poultry production has also increased so that China is reported to have three times as many chickens as the United States but the meat available from that source is only half that in this country (Borgstrom, 1972b, p. 2).

In the area of plant improvement, the primary emphasis has been on varieties with increased yields. More recently, emphasis is being put on varieties of plants that will tolerate cold or will grow in salty soils. It has been suggested that within the next few years, many new varieties of wheat that have withstood rigorous testing programs will be introduced, thereby increasing yields (Dawson, 1970, p. 104).

The net result of the changes in agricultural production efforts in China according to Dawson (1970, p. 208) are that "...if Peking's rice policy coordinated with other grain policy, continues with redoubling efforts in the following twenty or thirty years, a population food balance can be achieved." Presumably, this will involve a slight increase in wheat acreage with a slightly greater increase in potato production.

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The need for processing and transporting food in China is minimal since most foods are locally grown. Most large cities are surrounded by vegetable gardens and, occasionally, greenhouses to supply a part of the food needs of the people in the cities (Snapper, 1965, p. 9; Borgstrom, 1972a, p. 117). Harbin, a city in the north of China, is reportedly surrounded by 12.5 acres of greenhouses in which beans and tomatoes are grown the year round (Borgstrom, ibid.). An agricultural economy such as that has not eliminated the need for proper storage facilities. That the latter is not ideal is suggested by the report that although modern China has no dogs, there are large numbers of cats in every city. These are "sleek and fat, almost to the size of dogs" (Kinmond, 1957, p. 163). The size of the cats was attributed to an unrestricted diet of mice and rats "of which there seemed to be plenty" (Kinmond, ibid.). Under such circumstances, it is possible that the loss of food through predation by rodents may be considerable.

Most of China's grain is milled locally which, is the southern part, is accomplished in village mills. In the north of China, a number of large wheat mills have been built primarily to process the grains grown in Manchuria (Borgstrom, 1972a, p. 117).

The development of a food processing industry is underway, primarily to provide China with foreign currency. The foods that are sold abroad include frozen eggs, for which China, especially in the 1930s had an almost monopolist share of the world's market, canned fruit, fresh apples, frozen fish and canned, as well as evaporated milk (Borgstrom, 1972b, p. 13). The milk presumably came from Sinkiang and Inner Mongolia where the government of China has been developing primary livestock centers (Borgstrom, 1972a, p. 119). This has been done in a grassland area where the summer season is too short for the cultivation of cereal crops.

Fish production has been extended into many areas of China where both the rivers and ponds have been stocked with African silver carp. These fish are not only very prolific but grow at such a rapid rate that within one year they weigh a quarter kilogram, at which time they are ready to eat (Borgstrom, 1972b, p. 12). The heavily silted rivers in China have provided ideal conditions along its seacoast for a large fish industry. In those areas, fish freezing and processing plants have been established to supplement the much older dried fish industry. It has been estimated that the protein added to the Chinese diet by fish would, if provided by cereal grains, require an added acreage equal to "one-third the present tilled land of China" (Borgstrom, 1972b, p. 11).

The consumption of foods in the areas where they are produced has reduced the need for an extensive distribution system. With the limited road facilities and the meager railroad system, the problems associated with any major alteration in these systems would become staggering. As the population of the cities increased, it was inevitable that to secure more food would require an extension of food transportation mechanism. To circumvent, to some extent, such a requirement, it has been proposed that the primary reason for moving large numbers of people from the cities to the countryside was to

bring them closer to the sources of food, thus reducing the need for an increased transport system (Borgstrom, 1972, personal communications). A variety of other reasons have been put forth as explanations for the move of large numbers of city dwellers to the farming areas (Dutt, 1967, p. 183; Greene, 1961, p. 121).

Apparently, no nutritional survey has been performed in China since the end of the civil war. May $(1961,\ p.\ 18)$ claims that the last dietary survey was made by J. L. Buck in the 1930s. At the time of that survey, it was estimated that 75 per cent of the food consumed in any area was locally produced while the other 25 per cent was brought in from other areas. About 1953, a food rationing system was introduced throughout China $(May,\ 1961,\ ppg.\ 21-25)$. Whether that is still in effect is doubtful since none of the recent reports on China make any reference to it. This ration program was instituted when great emphasis was put on industrial production. Consequently, the workers in urban areas were allotted twice as much food as the peasants $(Dutt,\ 1967,\ p.\ 14)$. The differences in the distribution of food between industrial workers and peasants presumably was rectified in the late 1950s when greater emphasis was put on agricultural production.

Since such a large proportion of the food is locally consumed, the diet of the Chinese depends on the region where they live. In the southern part of China, the diet is monotonous and consists primarily of rice supplemented with soybean curd and vegetables pickled in salt (Winfield, 1948, p. 67). In the north, coarse breadstuffs are prepared from a mixture of wheat, millet, sorghum and soybeans. The diet in the latter region also includes noodles and small but increasing amounts of Irish potatoes (May, 1961, p. 14). Wheat in the diets of the northern Chinese provides them with a greater protein intake than is available in the southern part of the country. The resulting difference in protein intake has been proposed as an explanation for the greater height of the northern Chinese as compared to the southern Chinese (Sinfield, 1948, p. 71).

The most consistent shortage in Chinese diets is the caloric It is difficult to determine the magnitude of that shortcontent. age since so many factors are likely to influence it. The calorie shortage probably still exists despite casual reports that the present-day Chinese "are better fed, better dressed, bigger and huskier than the generation that had fought or sat out eight years of Japanese occupation and four years of brutal civil war" (Martin, 1972, p. 22). Reports similar to that have been made by a Yale biologist (Galston, 1971). This kind of nutritional evaluation may be open to question since it is largely based on an appraisal of the contours of the subject's face. A round full face would suggest a well-fed person consuming more than an adequate amount of food. That this may not always be the true situation is suggested by reports of parotid enlargement among individuals experiencing semistarvation. Although we saw nothing comparable to that among the young American volunteers who lost 25 per cent of their "normal" body weights during a period of 6 months (Keys, et al. 1950), it was seen among many of the South Korean soldiers examined by the late Dr. H. R. Sandstead (personal communication). His pictures of the soldiers in uniform suggested that they were well fed. Actually,

they appeared slightly obese on the basis of their 'moon-shaped' faces. However, when these soldiers stripped to their waists, it was evident that their caloric intake was inadequate according to Occidental standards. The ribs of these subjects were as visible as those among the semistarved Minnesota subjects. Examination revealed that the Korean soldiers had such enlarged parotid glands that their facial outlines belied their true nutritional condition.

Enlarged parotid glands were seen among the repatriated Germans following World War II. On their return from Russian POW camps, many German soldiers developed enlarged parotid glands. Apparently, the latter differed from those seen in Korea in that the parotid enlargement did not appear among the Germans until after they had been fed an adequate diet for a few days (McCance, et al. 1951, p. 135). These enlarged glands do not appear to be tender or inflamed (McCance, et al. ibid.). The few enlarged glands that have been examined histologically appear to be normal except for a slight increase in the diameter of the cells and some minor abnormalities which might be the result of removing the gland at necropsy (McCance, et al. ibid.).

Since most recent reports of the nutritional adequacy of the caloric intake of the Chinese are based on visual evaluation of the fully dressed individuals, it becomes essential to defer any conclusion in this area until more objective measurements are available.

Little is known about the current nutritional situation of the Chinese in relation to the other essential nutrients. Prior to World War II, China was the source of many descriptions of skin lesions associated with a vitamin A deficiency. Snapper (1965, $p.\ 23$) suggests that vitamin A deficiencies still occur among the Chinese since their diets are not only low in the vitamin A precursor (the carotinoid pigments in vegetables) but also in fat which facilitates the absorption of the carotinoid pigments. The little fat present in the Chinese diet was primarily of vegetable origin. It was derived mainly from peanuts, sesame seeds and occasionally soybeans. As a result, the plasma fatty acids of the Chinese studied by Snapper (1965, $p.\ 29$) had very high iodine values, suggesting the presence of a high proportion of polyunsaturated fatty acids. This fact, according to Snapper (ibid.), may explain the low incidence of atherosclerosis among the Chinese.

Vitamin D and calcium are other nutrients which have been very low in the diets of many Chinese (Winfield, 1948, p. 71). Deficiencies of these nutrients among women were especially common in Shansi province. There it was customary to provide a nursing mother, for the first month after parturition, with a thin rice gruel. This gruel, deficient in calcium, was given at a time when the demands for that mineral were very high. The result of such treatment instituted after each delivery was demineralization of the mother's bones, with the development of osteomalacia (Snapper, 1965, p. 10+). Again, it is impossible to determine the extent of this form of nutritional disturbance. Osteomalacia, reportedly, did not exist in those regions of China where the nursing mother was fed pigs'

ribs which had been cooked in a sauce containing vinegar. This was an excellent source of calcium (Winfield, 1948, p. 72).

Of the other nutritional disturbances, about all that can be stated is that a great variety of them existed. Prior to the last war, protein deficiency was quite common, as evidenced by the low plasma protein levels among all patients admitted to the Peking Union Medical College Hospital (Snapper, 1965, p. 27). Associated with the protein deficiency and a semistarved condition is the nutritional edema which May (1961, p. 28) reported as occurring among the Chinese as recently as 1960. He also claimed that beriberi occurred in the urban centers where the cereals are more thoroughly polished than in rural areas.

Although large deposits of oil have been discovered in China (Borgstrom, 1972a, p.126; Dawson, 1970, p. 143), the average Chinese housewife has to depend upon straw, small branches and perhaps dried dung to provide the heat needed to cook her food. These fuels produce a brief flame which exposes the food to a minimum amount of heat. This probably reduces the destruction that the nutrients would otherwise undergo if the heating had been prolonged. The nutritional quality of the food is further maintained by cooking vegetables and other foods in minimal amounts of water or oil (Winfield, 1948, p. 68).

The primary deficiency in the area of Chinese nutrition is the absence of facts. What little information is available is based on personal and frequently superficial observation of limited groups of people. This makes it difficult to determine the extent to which the improvement in food production has been able to keep up with the increasing population. The exports of rice and other foods by China, rather than indicating the existence of surplus food may actually be a means of increasing the available cereal supplies. One reason for that is the world price differential between wheat and rice. By selling rice, it is possible to secure sufficient currency with which to purchase a greater weight of wheat. As Borgstrom (1972a, p. 119) has pointed out, this transaction not only increases the overall calorie supply but also increases the available protein by 25 to 30 per cent.

There is no questioning the fact that food production in China has increased during the past quarter of a century. Many factors were responsible for that, but one of the more important was the recognition by governmental officials that food is a very important factor in the lives of the peasants who comprise 80 per cent of the population. Although nothing can be said about the general nutritional condition of the people in China, all reports agree that there is a more equitable distribution of food among the peoples in all parts of the country. This is suggested by the apparent absence of massive starvation despite stringent reductions in food production in China's northwestern provinces during the early 1960s. Chinese agriculture has been so basically subsistence that adverse climatic factors in any large region has meant, in the past, extensive famine with starvation the fate of large masses of people. Despite crop failures in three successive years as a result of poor weather, there

were no reported cases of starvation attributable to the food shortage. Unfortunately, nothing is available to indicate what relief measures were taken to provide the people with food. Recognizing the limited transportation available throughout most of China, it must have required a gigantic effort to move the tons of food required to feed the people in the large area afflicted with the crop failures.

The prospects for any improvement in the nutritional condition of the Chinese depends on how successfully the population increase is controlled. The rate at which the numbers of people in that country have been increasing is well illustrated by Borgstrom (1972a, $p.\ 109$). He points out that the situation in China is comparable to adding a greater New York to the population each year. This means an increase of 15 to 20 millions of people in one year.

The meager supply of calories available to the Chinese means that the nutritional condition of its people is, and will be for years to come, China's most important health problem. The incidence and severity of many diseases among the Chinese will be intimately related to the nutritional status of the people. To paraphrase Snapper's statement (1965, p. 9), one could conclude with the admonition: If you wish to determine the health and medical condition of the Chinese, first evaluate their nutritional status.

I am particularly indebted to Dr. Georg Borgstrom, Professor of Food Science and Geography at Michigan State University for his generous assistance in providing a great deal of helpful information about China.

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7. POPULATION DYNAMICS AND FAMILY PLANNING

Fogarty International Center Staff Comments:

Successful sanitation and public health campaigns of the 1950's improved the general health of the urban population, and decreased infant mortality. The increase in infant survival has produced a situation in which a sizeable percentage of the population is not productive and presents a drain on the economy in terms of food, housing, education and services. The present rural health campaign would extend sanitation and public health services to the great rural population, and this may well result in another and much larger population increase. The problem is one of increasing health and productivity on one hand, and relating the rate of population growth to its resources on the other.

In reviewing medicine and public health in China it appears necessary to focus some attention on the basis for official Chinese population statistics and their validity, and to explore and evaluate the techniques used by the Chinese in attempting to relate population to resources. Attention should also be directed to the problems that attend the integration of these measures into the total national health system.

Dr. Bowers called on Mr. Leo Orleans of the Library of Congress for comments on China's population and family planning. Mr. Orleans made the following statements on the subject:

I think it is a little surprising that so many people here have mentioned the lack of material and lack of knowledge of Chinese medicine because there undoubtedly has been more data published by Peking on medicine than any other major cultural endeavor.

In the population field, on the other hand, we have very little information to go on. We still have to go back to 1953 for our base figures on Chinese population. That was the year in which China took a census which showed a population of 582.6 million. Although there have been some heated discussions as to the validity of this figure, it is now generally accepted by everyone and all the projections of the population of China start with this figure.

After 1953 the Chinese attempted to set up a population registration system and they made some progress during the middle 1950's. However, all their efforts were destroyed by the Great Leap Forward. On the basis of this registration system they did publish a series of figures running from 1949 through 1957. This is the only official population series published by the Chinese. Since then we have not had a demographically based population figure from Peking. All we have had are general references in articles and speeches to 600 million Chinese, to 650 million Chinese, to 700 million Chinese and more recently to 750 million Chinese.

When the Chinese published the scanty data on the census they also reported a birth rate of 37 per thousand and a death rate of 17 per thousand, resulting in a 2% annual population increase. I think probably both of these rates are low. More likely the birth rate was in the low or middle 40's and the death rate in the middle 20's at that time. Since then, although we know what some of their policies and programs have been, we can only speculate about the population growth rate. We know that the Chinese have been quite concerned about the size of their population and its rate of growth. In the middle 1950's they initiated a birth control campaign and established birth control clinics. The propaganda on family planning was widespread, but it had little effect on the birth rate, except perhaps in the cities. 1958, with the introduction of the Great Leap Forward, this campaign was dropped. We did not hear anything more about population until the early 1960's when once again some articles started to mention the need to delay marriages and, for the sake of the health of the mother and child, to reduce the number of children per family. More important, however, numerous articles started appearing in Chinese medical journals dealing with the practical aspects of birth control.

By this time the Chinese had already started to increase significantly their health programs in rural areas. Mobile medical teams started to go out into the countryside and one of the primary functions of the medical personnel assigned to these teams was to promote birth control and to educate the population on the use of contraceptives. There was also some talk about abortion and sterilization, but most of the emphasis seemed to be on the conventional contraceptives, on the IUD's, and, in later years, on the pill.

There is quite a bit of disagreement as to whether all these efforts had any effect on the Chinese birth rate and any effort to translate these developments into figures is very speculative. Now, I personally feel that during the last half dozen years or so they have been having significant success. Not only are the medical personnel who are now located in all the villages, succeeding in motivating the rural population to use the various contraceptives available to them, but there now seems to be a stigma attached to large families, particularly among young people. I understand that this general conclusion is, to some extent, verified by Dr. Dimond, Dr. Sidel and some of the other recent visitors to China.

As for the death rate in China, I think these trends can be followed with somewhat more confidence. We know that the Chinese have made great progress in all phases of sanitation. Undoubtedly mortality from infectious diseases has gone down drastically. There were a few zig-zags in it, so that the death rate probably increased in the early 60's during the critical years after the Great Leap, but it has probably been on the downward trend again since the Cultural Revolution. As for any estimate of the specific level of mortality in China, it can only be an outright guess.

Many people have been quite optimistic since China was admitted to the United Nations, figuring that soon we should be getting new data about the country. I personally don't think that we will have any data on China's population because they themselves don't have it and don't really know what their population is. It is very difficult for people to accept this statement, because they think of China in terms of a controlled society and a planned economy. Surely the regime must know the size of the country's population. Not long ago we had proof to the contrary in a rather unusual statement by a Chinese cabinet minister, interviewed by a Cairo newspaperman. He said:

"Some people estimate the population of China at 800 million and some at 750 million. Unfortunately, there are no accurate statistics in this connection. Nevertheless, the officials at the supply and grain department are saying confidently, 'The number is 800 million.' Officials outside the grain department say the population is '750 million only' while the Ministry of Commerce affirms that 'the number is 830 million.' However, the planning department insists that the number is 'less than 750 million.' The Ministry of Commerce insists on the bigger number in order to be able to provide goods in large quantities. The planning men reduce the figure in order to strike a balance in the plans of the various state departments." *

I was not going to mention anything about population distribution, but considering its pertinance to geographic pathology and some of the other subject areas discussed this morning, a few words may be in order. If you draw a straight line from northern Manchuria to southern Yunnan Province, you have some 40% of the land area and about 95% of the population on the eastern (coastal) side of the line, while 60% of the land area and only 5% of the population are west of this hypothetical line. China has been trying to reshuffle this population and to move some of the people from the densely populated East into the sparsely settled but strategecally and economically important areas along the country's western and northern periphery. As important as this movement was for the areas of in-migration, it has not been very significant in relation to the country's total population.

Also important in connection with several things that were said this morning is the distribution of the population between the urban and rural areas. The initial growth of the Chinese cities is now apparently under control and the regime is trying to absorb all the excess manpower in the rural areas by developing a great variety of local industries in the countryside. This program is so intensive that we might have to rethink our urban-rural definition in connection with China.

The main question that is supposed to be addressed at this meeting is where do we go from here in terms of future research. In the population field the question is not easy to answer. The absence of data has already been mentioned. Furthermore, I don't think that visits to China will reveal any new information on this subject

^{*} Cairo Al-Jumhurivah in Arabic, p.9 as reported in FBIS Daily Report: People's Republic of China (FBIS-CHI-71-238), Dec 10, 1971, p. A-8

because the Chinese will not talk about population. They will talk about family planning programs because they are proud of their accomplishment in this program. But they will not talk about statistics because they are not proud of them and because they don't have them. So, the most promising approach to more information in the population field may well be through the medical people who will be visiting China in the future. Medicine is a field in which the Chinese seem to be anxious to establish communications with the U.S. and undoubtedly these contacts will increase. That is why I think that for some time to come the most profitable research on the population of China will be based on information obtained in the fields of medicine and public health and translated into demographic terms.

8. MEDICAL CARE IN URBAN AND RURAL AREAS

Fogarty International Center Staff comments:

While Mao Tse-tung has always championed the bringing of medical care to the rural peasants, a comprehensive mass movement in this direction did not materialize until the Cultural Revolution. ginning in 1966-1967, up to one third of city medical facilities and hospital staffs, together with recent medical graduates, many medical students, and substantial numbers of paramedical personnel were sent to remote rural communes to establish a system of rural medical care. This movement was monitored and administratively controlled by the army. Clinics and aid stations were established and staffed, and large numbers of politically reliable workers began to receive three to six months of training as "barefoot doctors." Because of shortages of drugs and equipment, the traditional practice of acupuncture has been heavily used, and it is estimated that some 90 percent of the medical treatment presently available utilizes this method. Preventive measures however also include mass immunizations. Emphasis on establishing health centers in rural areas has depleted city hospital staffs to the point where they cannot care adequately for the urban population.

The costs associated with the rural health program are being at least partially defrayed by a cooperative medical service plan that functions essentially like U.S. hospitalization plans, except that costs to the individual are very low.

Since there is considerable U.S. interest in extending good medical care to our own rural areas, it may be of interest to study the Chinese system in some detail, particularly in its administrative, financial, and medical supply aspects. While the training of paramedical personnel in China follows a different path from the system that the U.S. is developing, a study of Chinese methods of affording paramedical training to large numbers of persons and the criteria for their selection may prove profitable.

Dr. Bowers asked Dr. E. Grey Dimond to open the discussion on rural or urban medical care. Dr. Dimond made the follwoing statements:

We have an immensely successful suburban brand of medical care in the U.S.A. It is very successful for the middle class and upper middle class and they get the finest care after the fact in the U.S. China was mimicking that considerably before the Cultural Revolution. During the Cultural Revolution, the university level of instruction was stopped for three years, and one third of the staffs of all hospitals, province hospitals, specialty hospitals, was ordered into the countryside at any one time. This included all of their vehicles, one third of them, all their nurses, all of their engineering help, in other words, one third of the facility was sent to the countryside and given a geographic area where it was to provide medical care. Visualize what that would do in the U.S., if we would decide to do it in the Indian territory or in the ghettos. Using this concept,

the specialty hospitals and university hospitals had to shut down much of what they were doing and assume a major rural duty. That one third responsibility has continued and as the medical schools have been reopened, one third of the medical school's student body is out with the staff, being taught, so to speak, on location, seeing public health medicine as it actually happens. Although they did take vehicles with them, essentially they were on foot. Although they were based at the regional commune hospital there, they were out in the rice fields carrying their equipment and making village calls. Their job was several fold, one was to provide first class medical care, such as hernia repair and things of that type that really needed to be done. The second function was to give medical students instruction at night in the local grade school, giving the medical student classroom instruction on how to look for parasites in the stool, for example. The third thing they were doing was giving continuing education courses, and I really mean in the bonafide sense of the word, to the doctors and nurses and "barefoot doctors" who are in the countryside. Again, I say, think of that in western Missouri or western Kansas or in the ghetto as not a bad system of providing continuing education; of going where the sudent, nurse, physician, "barefoot doctor" actually is. Finally they are out there having an intense indoctrination in what the government policy is. They have been separated from their wives and comforts of the city. Everyone is out as a member of a work crew and not as a family on vacation. They are having intense indoctrinations each morning just after they have their Chairman Mao physical fitness training program, which is just before they head out into the rice paddies with their daily health assignments. That health care program I can't fault. If you told me that I had to get medical care to 800 million people who had backed me in my revolution, that is just about the way I would go about it. You would have to go over the medical personnel roster, get them activated and get them into the countryside. China has done that respectably.

The "barefoot doctor" has a six week training program in some of the areas I saw. I don't know what the national policy might be. He is essentially a farmer. He farms at least 90% of the time or has a job in the village as a "smithy," for example, and his job is to maintain health records. The vaccination records in a large commune had evidence of when the person was born, what illnesses he had had, what accidents he had had and what vaccinations he had had. Those written records were superb, and they were maintained by the "barefoot doctor." He was continually getting courses and carried a little booklet in which the teacher would certify that he had had a certain amount of instruction. So it is not loosely done. The education and instruction are all there, evidence that he had advice on how to place a splint or evidence that he had learned how to use acupuncture.

The more seriously ill patients were sent back to the commune hospitals. One patient I saw had four fingers sewed on in a commune hospital. The surgeon in charge of a hospital had 420 consecutive cases since he had taken over without a wound infection. The hospital maintained its own botanical garden, and it grew, collected and prepared vials or capsules of their herbs. They were making their own distribution. The patient who had a problem that too large was simply

taken by vehicle to a provincial hospital, which was like a typical USA general hospital.

The medical schools were reopened just a few months before I was there in September 1971, and they were reopened on a 3 year basis and pharmacy school on a two year basis. In terms of the lateral or upward mobility in health careers, something we talk about in this country, any nurse who had five years experience was eligible to enter medical school and be graduated in 12 months. No one may go to medical school or dental school until they have gone to work in a commune or the Army and put in another 2 years demonstrating that they are working members of the society and have party endorsement. I suggest that this would be one of the best ways in the United States for students who disagree with the education program, perhaps 24 months of intensive work in our forests of National Parks might be one approach to getting the appropriate people in our universities. A thorough study or indoctrination of the Constitution or Bill of Rights during this work period would equally be a useful thought.

In the commune hospital and in the commune education center were charts not only on how to get birth control advice but on what to do with a limb in case it was cut off out in the field, how to wrap it and how to rush it back for getting ice around it.

Medical care in the home was done well. The "barefoot doctor," since he works with the people, alongside them, learned whether they had an irritated eye or a sore ear, or learned if the baby was sick. He simply had a small neighborhood practice, lived in and worked in the neighborhood. His first line of defense was one of cleanliness, boiling the water and listening to them. He used acupuncture very freely. I was surprised at the amount of unsterilized acupuncture employed with no thought of hepatitis.

The ready availability of the "barefoot doctor," his immediate access to more definitive help, his excellent continuing education program, his own "upward mobility" possibility, all made him an impressive health team member.



9. CANCER RESEARCH

Fogarty International Center Staff Comments:

Cancer research in China appears to have begun in earnest in the mid-1950's and showed continuous progress until 1966 when cancer publications ceased due to the Cultural Revolution. Western scientific reviews of Chinese papers offered at the Eighth International Cancer Congress in Moscow in 1962 were generally complimentary. The Chinese work was characterized as solid and well designed but showing no great innovation. Chinese research efforts appear to have centered on the basic science and clinical aspects of nasopharyngeal and esophageal carcinomas, cervical carcinoma, choriocarcinoma, and primary hepatic carcinoma. Recent news reports suggest that the Chinese Government will reactivate cancer research. While Chinese cancer research has not been judged meritorious in terms of new discoveries, the amount of clinical material available for study has been very lagge when compared with comparable Western studies. This suggests that research conclusions may be quite valid and worthy of serious attention in the West.

Dr. Bowers introduced Dr. Haitung King of the National Cancer Institute, National Institutes of Health to discuss cancer research. He made the following statement on the subject:

The importance of cancer research in the People's Republic of China was clearly indicated in the national 12-year plan for scientific development proclaimed in 1956. The proliferation of agencies devoted to cancer studies showed the impact of the program. In experimental tumor research alone there were about 24 agencies engaging in research activities until 1959, notably the Tumor Institute, the Research Institute of Experimental Biology, the Research Institute of Pharmacology, and the Research Institute of Experimental Medicine, all in the Academy of Medical Sciences. A wide range of studies was initiated covering such areas as tumor development, tumor metabolism, tumor immunology, tumor transplantation, and tumor therapy.

A notable experiment in tumor therapy is the use of actinomycin K., which was isolated in 1957 from streptomyces melanochromogenes, obtained from the soil in South China. When used experimentally with nitrogen mustard, the drug showed a marked inhibitory effect on animal tumors. The drug reportedly was tried on Hodgkin's disease patients with encouraging results.

Recently, the use of <u>kengshenmycin</u> along with other therapeutic agents commonly known in Western literature was reported to be effective in the treatment of malignant trophoblastic tumors. As shown in Table 1, the mortality figure of choriocarcinoma decreased

from 89 to 57 per cent during 1949-1965, and that for chorioadenoma decreased from 25 to 13 per cent. Since 1965 the mortality figures have decreased to 39 and 5 per cent, respectively.

Other statistics on therapy indicated that the 5-year survival rates for patients in all stages of cervical cancer receiving radiation therapy at three hospitals (Peking, Shanghai, Tianjin), 1948-1954, ranged from 53 to 75 per cent. This is similar to a 51 per cent rate for U.S. registered cases for the years 1950-1954. However, differences between the two countries with respect to selection of patients and other factors must be considered. In the case of cancer of the esophagus, the 5-year survival rate following resection was 23.7 per cent (Fu Wai Hospital, Peking, 1940-1960).

Since 1955 cancer studies directed to the materia medica of China have been greatly intensified. In that year the Institute of Epidemiology in the Academy of Medical Sciences began to screen anti-tumor herb drugs of simple formula. Subsequently, intracorporeal screening for anti-tumor compound and simple traditional formulas in experimental animals was initiated in the Research Institute of Experimental Medicine, the Research Institute of Pharmacology (both in the Academy of Medical Sciences), and in several medical colleges.

Reportedly great progress was made in the treatment of cancers of esophagus, stomach, colon, and breast as a result of a combination of traditional and Western medicine. In patients with cervical malignancy, reports said that some traditional drugs reduced cyclical changes in a manner similar to radiation therapy. The drugs were said to promote substantial relief of pain and distress in many advanced cases. Two drugs, lithospermum officinale and pei yao (produced in Yunan province), reportedly were beneficial in treatment of choriocarcinoma.

In addition to the findings of special studies, epidemiologic research has been greatly facilitated by accumulation of massive statistical information from extensive analyses of microscopically examined materials. The results from cancer survey, registration, and screening programs further open new avenues of inquiry. Some of these epidemiologically relevant results are presented below.

Three cancer sites are known to have high risks among the Chinese, namely, esophagus, liver, and particularly, nasopharynx. For cancer of the nasopharynx, incidence rates of 4.8 (male) and 2.2 (female) per 100,000 were reported for Shanghai, 1960, compared to 0.6 and 0.1, respectively, for Connecticut, U.S.A., 1963-1965. Of particular interest is the apparent higher frequency of nasopharyneal cancer in South China than in North or East and the striking Kwantung/Fukien (provinces) disparity shown for southern Chinese. Consider the latter: The proportions of this site among all cancers combined (confirmed autopsy cases) were 25 and 6 per cent for the capitals of Canton (Kwangtung) and Foochow (Fukien), respectively. Such a disparity seems to support the biogenetic predisposition hypothesis, but the influence of ecologic and sociocultural intervention can not be ruled out.

In contrast to nasopharynx, esophageal cancer appears to have a slightly higher frequency in the North than in the South. The reported incidence rates per 100,000 general population were 10.9 (male) and 4.9 (female) for Shanghai, 1960, compared to 6.6 and 1.8, respectively, for Connecticut, U.S.A., 1963-1965. Consumption of vodka-like pei kan (made of kao liang, a sorghum plant grown in the North) is generally considered to be associated with this malignancy.

Liver is another highly susceptible cancer site among Chinese. It was reported that out of 2,424 autopsies on Chinese at the Peking Union Medical College, 1917-1942 and 1947-1950, 19 or 0.8 per cent of the cases were diagnosed as primary cancer of the liver. The earliest known age at diagnosis of this malignancy is 38 days after birth. Diagnosis in males rises from that age up to the sixth decade of life. Several theories seek to account for the high risk of the liver cancer, including schistosome or clonorchis sinensis infection and liver cirrhosis. Comsumption of raw fish is thought to be a major source of clonorchis infection in south China.

Several cancer sites apparently are relatively infrequent among the Chinese, notably the prostate and the female breast. A low incidence rate of lung cancer was also reported for Shanghai, although this seems not to be in keeping with recent observations of visitors to China who noted a rather high prevalence of smoking among the Chinese.

Other malignancies of interest are noted. One is the colonic cancer, the frequency distribution of which appears to be higher in east China than in the north. The reason is thought to be related to the endemic prevalence of schistosomiasis over vast areas south of the Yangtze River, where mild climate, abundant rainfall, extensive irrigation, and fertile soil are favorable for the breeding of a possible intermediate host and spreading of the infection.

Another is choriocarcinoma, the relatively high frequency of which led to the formation of a special study section in the Academy of Medical Sciences in 1958. Another is the skin cancer, which has strikingly high frequency in north China. One possible correlate could be the wide and prolonged use in the winter in this area of the "Kang," or heated brick bed.

The above cursory review clearly indicates that the Chinese present a distinctive site profile of cancer risks. Further investigation could add much to our understanding of this dease.

Table 1. Therapeutic Restults of Treatment of Malignant Trophoblastic Tumors, Fan Ti Hospital, Peking, 1949-1968

		Tota		Tota		Total	
Period	Type of Treatment	Number of Cases	Deaths (Percent)	Number of Cases	Deaths (Percent)	Number of Cases	Deaths (Percent
49 - Jul 58 Surgery ^a	Surgerya	64	62.5	37	89.2	27	25.9
Aug 58 - 65	Combined chemo- therapy & surgery ^b	238	37.4	131	57.3	107	13.1
66 - 68*	Combined chemo- therapy & surgery ^C	279	20.4	126	38.9	153	5.2

*Includes deaths up to November, 1970

- a Some patients received deep x-ray irrdation and/or chemotherapy (nitrogen mustard and nitronim)
- b The main chemotherapeutic agent was 6 Mercaptopurine (6MP), with occasional use of Methotrexate (MTX) 1964, 5 Fluorouracil (5 Fu) and Kengshenmycin (KSM) were used in a few cases.
- The chief therapeutic agents were 5Fu and KSM; 6 MP and MTX were used occasionally.

Fogarty International Center Staff Comments:

Twenty years ago China was a country in which disease was wide-spread, adequate medical care limited to a small segment of the urban population, modern sanitation was virtually unknown, and the death rate fluctuated between high and very high. Today, medical care is more widely distributed, the Chinese people are inoculated against most diseases; they are very conscious of cleanliness; and the country's death rate has dropped appreciably. As the one policy most responsible for this striking achievement relates to the education and training of manpower, a study and understanding of the innovations in method and content that have been introduced by the Peking regime in this field appears to be worth considering.

The training of fully qualified physicians in China has been a subject of wide variation for many years. Essentially the problem has been one of a contest between those influential forces that advocate quantity over quality, and those forces who advocate the opposite. This has resulted in periods where physicians received short, incomplete medical courses in order that they may bring a measure of medical care to all of the masses, and periods where longer and qualitatively superior training has been given to fewer individuals, thus delaying total medical coverage among the masses. The latter circumstances prevailed over roughly the decade 1955-1965, and has now been replaced by the former where medical curricula have been shortened from five or six years to two or three years. Although medical schools continued to graduate highly trained physicians until the Cultural Revolution, the greatest stress was on sub-professional medical training. Since the early 1960's there has been emphasis on half-farm, half-study medical schools, short courses in public health, the training of "barefoot doctors", and a great variety of other programs that turned out both full-time and part-time medical personnel for both urban and rural areas. The Chinese did not copy -- they innovated, and this seems to warrant a closer study.

Dr. Bowers called upon Dr. Ronald Christie, Dean Emeritus, McGill University, School of Medicine, Montreal, Canada who visited China in the early 1960's and who agreed to speak on the subject of Medical Education, Training and Manpower. He made the following statements:

We are nearing the end of the day and I will be just as brief as I can, avoiding any repetition of what has been covered by the previous speakers. In 1961 I went to Peking to establish an exchange professorship between the Peking Medical College in China and McGill University. Since then we have sent six visitors from McGill, all of them before the Cultural Revolution, and there have been four visitors from Peking, one pair just before the Cultural Revolution and one pair in the fall of 1971. During the period we were in China there were about 80 medical schools teaching modern, or if you like, Western

medicine. The Peking Medical College, which was closely linked with the Chinese Academy of Medical Science, was held to be the best. was the old Rockefeller Peking Union Medical College and there was little change; a few additions, some renovations, but more or less as it was in the Rockefeller days. The hospital had 15 departments and 28 specialty divisions and we were agreed that it was fully up to North American standards. We spent some time in the research laboratories, both in Peking and in other medical schools that we visited, and again the standards were high, as has already been emphasized by Dr. James Chen. The curriculum in Peking resembled that of North America - 3 years of college and 4 years of medicine, followed by a compulsory internship. One difference was that during the clinical years there was some instruction in traditional medicine. The school only had 60 students who were a carefully selected group. The principal purpose of this school at that time, was to produce first class teachers for other medical schools and also to set a standard or a model for other schools to follow. In the other 80 schools some had a six year medical course and the others a five year course very much on the European style with the students coming straight from high school to a pre-medical year and then four or five years of medicine. A few only had a total of four years including the pre-medical year. At that time we were told that there were about 100,000 physicians in China trained in Western medicine and about 500,000 trained in traditional medicine. The policy was to promote Western medicine, remembering that Western medicine had something to learn from traditional medicine. I am told that the number of Western graduates today is something on the order of 200,000. The situation in China is comparable to the situation in India, where, if traditional medicine were abolished, there would be a vacuum that Western medicine could not possibly fill.

The Peking College was a special target of the Cultural Revolution. Because it was so obviously based on the North American pattern, it probably suffered more than others and there followed a period of great confusion which Dr. Dimond described very graphically. The duration of the medical course in Peking was reduced to three years as was the case in the other medical schools and the number of students was greatly increased. The curriculum is subject to constant revision and change but in general involves a year of preclinical work, a year of clinical work in the wards and a year of supervised work in the community.

We have been asked to suggest lines of contact that might be made with China. Dr. Dimond has covered most of the areas I would have suggested but medical education should be added. Many of the changes in medical education which are being introduced in North America are very similar to those which followed the Cultural Revolution in China. I am referring to changes such as student participation in decision making and in shaping the curriculum with emphasis on the relevance of what is being taught, the reduction of the medical curriculum to three years, the abolition of graded examination results, the increase in student numbers to an annual entry of 200 or more, and the orientation of medical schools and clinical instruction towards the community.

Other areas of common interest which could form the basis of contacts with China have been described in some detail by Singer and Galston.* The success of these contacts will largely depend on the choice of those subjects from which we have something to learn from the contribution China has made.

^{*} Signer, E. and Galston, A.W. Education and Science in China. Science, 1972, 175, 15-23



CONCLUDING REMARKS

Dr. Bowers:

Well I think we have come to the time of day when we need to summarize what we have discussed today. I made a few notes as I went along which I will present and I'm sure there are further comments others might like to make if they desire.

I was impressed with Dr. Telford Work's comment on the need for an epidemiology base for data collection on diseases in China, the need for what may be described as an epidemic intelligence system by which they and we could get more and better information. I was wondering myself if we really are making maximum utilization of Hong Kong, a window on China, as a source of information. On the times that I have worked in the American Consulate at Hong Kong I have found there is a great deal of information on medicine from the monitored broadcasts and translations, but there has really been very minimal medical utilization of this material. There is a part-time, and I don't say this in any disparaging sense, junior level U.S. Public Health Serice officer who is in and out of Hong Kong, his only area of responsibility. But I have wondered whether we might consider greater utilization, by a full-time medical staff study, of the information that we record in Hong Kong.

The point has repeatedly been made concerning the desirability of studying Chinese traditional medicine in comparison with Western medicine, its effectiveness and the understanding of it. At a time when there is the opportunity for us to learn a great deal about China, the number of American medical scholars who can work in the Chinese language is about zero. This I think is true in other fields as well. I believe it is a question, a problem that does demand some very real consideration. I think that the foundations and/or the government should be establishing programs whereby medical graduates, not just young ones, could be trained in Chinese and work in Chinese medicine as a career. I think that today, in view of all the interest there is in China, we would find some bright young men requesting opportunities for such studies. We have mentioned the fact that there is a high incidence of esophageal cancer, a high incidence of liver cancer, and a high incidence of schistosomiasis on the disease It is clear there is a great deal we can learn in China about cancer which is such a world-wide problem. Another rather special disease problem in China, and in Japan as well, which we haven't touched on very much today, is the very high incidence of cerebrovascular accidents, far higher than in the Western world. Of the incidence I would say that, while here we have great problems with coronary artery disease, the problem in China is with cerebral artery disease for perfectly unknown reasons.

Finally, I think that the one point we made repeatedly is the excellent program in health education in China, starting at the

school level. I have heard Chinese friends in Hong Kong complaining about the fact that their relatives come to visit them from China. They bring along their 6, 7, 8 year old children who lecture to their elders in Hong Kong about the problems of education and how they must wash their hands and brush their teeth. The relatives always say they are glad to see them go back to China. But there's no question that they have done a remarkable job and have splendid programs in public school education, beginning, I suppose, at kindergarten level and carrying right through. I think this whole thrust is one of the very important factors in the great medical and health advances that we're seeing today in China.

I did not mention acupuncture. That has been covered pretty well already. I didn't mention native drugs. I think we realize that there are great potentials there. I was interested in Dr. Chen's remarks to me earlier. He had gone back to China to teach pharmacology at the PUMC and he went down to Shanghai to visit his family, his mother. He accosted a Chinese traditional practioner and said that he wanted to work on native products, but his approach I think was interesting in that he asked the practioner to give him a list of the 10 most toxic in the Chinese formulary, the 10 most poisonous as it were. Of course the drug he listed at the top was marijuana because it does have very powerful circulatory and psychic effects. So that there is certainly a great deal we can learn about studies on the Chinese herbal remedies.

I have a report from the head of a committee who had been on a 6 week visit in China. He gave quite a considerable amount of material about the efforts and changes being made in the treatment of mental health and I think there's enough there that they may feel considerable pride in. They have moved toward a very much greater, one to one attention to the disturbed patient. They're paying enormous amounts of attention to the individual case. The answer is in line with their manpower surplus and political concern for the individual. They are using the group as therapy and turning the group into supporting individuals, rather than the individuals just being part of a group of mentally ill. Based on that one report, I think this might be a lead to another fertile area for study.

ANNEX A

List of Attendees

Mr. John S. Aird Chief, China Branch Foreign Demographic Division Bureau of Economic Analysis Department of Commerce 108 Delford Avenue Silver Spring, Maryland

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Dr. John Z. Bowers President Josiah Macy Foundation 277 Park Avenue New York, N.Y.

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& Metabolic Diseases (NIAMD)
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Mr. Arthur A. Campbell
Deputy Director
Center for Population Research
National Institute of Child
Health & Human Development
(NICHD), NIH

Dr. Robert M. Chanock, Chief Laboratory of Infectious Diseases National Institute of Allergy & Infectious Diseases (NIAID)

Dr. James Y. P. Chen Director, Medical Research California Medical Group Santa Monica, California Dr. Ronald V. Christie Dean Emeritus, Faculty of Medicine McGill University Montreal, Canada

Dr. William H. Cope
Ass't Director, Int'l Health
Office of Program Planning &
Evaluation
Health Services and Mental Health
Administration (HSMHA)
Department of Health, Education,
and Welfare (DHEW)

Dr. Robert De Caires Associate Director Division of Policy Planning and Evaluation Office of International Health (OIH) DHEW

Dr. E. Grey Dimond Provost for Health Sciences School of Medicine University of Missouri Kansas City, Missouri

Dr. Thomas D. Dublin Program Evaluation Staff Chief Office of the Director Bureau of Health Manpower Education (BHME), NIH

Dr. Oscar Felsenfeld Chief of Communicable Diseases Delta Regional Primate Center Covington, Louisiana

Dr. Donald E. Goldstone Office of Program Planning and Evaluation HSMHA, DHEW

Dr. Howard Jenerick Program Director Biophysical Sciences National Institute of General Medical Sciences (NIGMS), NIH Dr. Stephen Kim Medical Librarian Oriental Area Specialist National Library of Medicine (NLM), NIH

Dr. Haitung King Special Cancer Survey Section Biometry Branch National Cancer Institute (NCI), NIH

Dr. R. W. Lamont-Havers Associate Director Extramural Research & Training Office of the Director (OD), NIH

Dr. Milo D. Leavitt, Jr. Director, FIC, NIH

Dr. Choh-Luh Li Associate Neurosurgeon Surgical Neurology Branch National Institute of Neurological Diseases & Stroke (NINDS), NIH

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Dr. Olaf Mickelsen
Professor of Nutrition &
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Department of Foods & Nutrition
College of Home Economics
Michigan State University
East Lansing, Michigan

Dr. J. David Miller Chief, Mental Health Career Development Programs HSMHA, DHEW

Dr. Francis D. Moore Peter Bent Brigham Hospital 72l Huntington Avenue Boston, Massachusetts

Dr. Franklin A. Neva Chief, Laboratory of Parasitic Diseases, NIAID, NIH Dr. Ayub K. Ommaya Associate Neurosurgeon Surgical Neurology Branch NINDS, NIH

Mr. Leo Orleans China Research Specialist Reference Department Library of Congress Washington D.C.

Mr. Roland Peterson Director, Planning & Evaluation Regional Medical Programs Service HSMHA, DHEW

Dr. Joseph R. Quinn Chief, International Cooperation & Geographic Studies Branch, FIC, NIH

Dr. Alan S. Rabson Deputy Chief Laboratory of Pathology, NCI, NIH

Dr. Olaf Skinsnes Professor of Pathology School of Public Health University of Hawaii 1960 East West Road Honolulu, Hawaii

Dr. Gerald Winfield
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Dr. Fred Wolff Consultant, Bureau of Drugs Food & Drug Administration, DHEW

Dr. Telford Work
Professor, Infectious & Tropical
Diseases
School of Public Health
University of California
Los Angeles, California

ANNEX B

Topics Warranting Further Study

in

Selected Areas of Chinese Medicine and Public Health

I. GEOGRAPHIC PATHOLOGY

- A. Geographically limited diseases of concern to Chinese people.
- B. Methods and practices of reporting diseases.
- C. Chinese use of mapping systems in geographic pathology.
- D. Effect of population mobility, or lack thereof, on geographic disease patterns.
- E. Influence of climatic conditions and terrain features upon disease patterns.

II. EPIDEMIOLOGY OF INFECTIOUS AND PARASITIC DISEASES

- A. Principal infectious and parasitic diseases.
- B. Preventive and quarantine measures in effect, local and national.
- C. Training programs for health personnel.
- D. Role of commune, production brigade and production team health personnel in identifying and treating these diseases.
- E. Development of new drugs to deal with infectious and parasitic diseases.

III. RESEARCH ON SEVERE TRAUMA

- A. Burn surgical techniques.
- B. Techniques of limb reattachment and physical therapy.
- C. Teaching procedures in surgical residency programs.
- D. Role of typical surgical team members in operations.
- E. Other surgical innovations applied to severe trauma.

IV. SCIENTIFIC BASIS FOR TRADITIONAL MEDICINE

- A. Current Chinese views toward the philosophical interpretation of traditional medicine.
- B. Use of pulse diagnosis, and other traditional diagnostic procedures, acupuncture, moxibustion and herbal medicine.
- C. Scientific versus unscientific practices observed in traditional medicine.
- D. Neurological, physiological, histological, and other basic science aspects of traditional medicine.
- E. Role of traditional versus modern medicine in China.

V. RESEARCH AND PRODUCTION OF PHARMACEUTICALS

- A. General availability of modern and traditional pharmaceuticals.
- B. Quality control and acceptibility of mass-produced serums and vaccines and antibiotics.
- C. Search for modern and traditional anti-tumor substances.
- D. Development of vaccines against specific infectious and parasitic diseases.
- E. General problems encountered by China in production of pharmaceuticals.

VI. NUTRITION

- A. Examination of the problem of population versus food supply.
- B. System of food distribution.
- C. General composition of food table.
- D. Regional or district nutritional status.
- E. Nutritional deficits and possible effect upon health.
- F. Specific nutritional research addressed to regional and national nutritional problems.
- G. Essential nutrients utilized to maintain an individual in a healthy, vigorous condition.

VII. POPULATION DYNAMICS AND FAMILY PLANNING

- A. Availability of demographers or population statisticians and type of training employed.
- B. National and local organization for collection, maintenance and reporting of population statistics.

- C. Difference in handling of data between urban and rural areas.
- D. Attitudes toward family planning, including contraception, abortion, and sterilization in rural and urban areas.
- E. System of organization of collection and dissemination of family planning information.

VIII. MEDICAL CARE IN URBAN AND RURAL AREAS

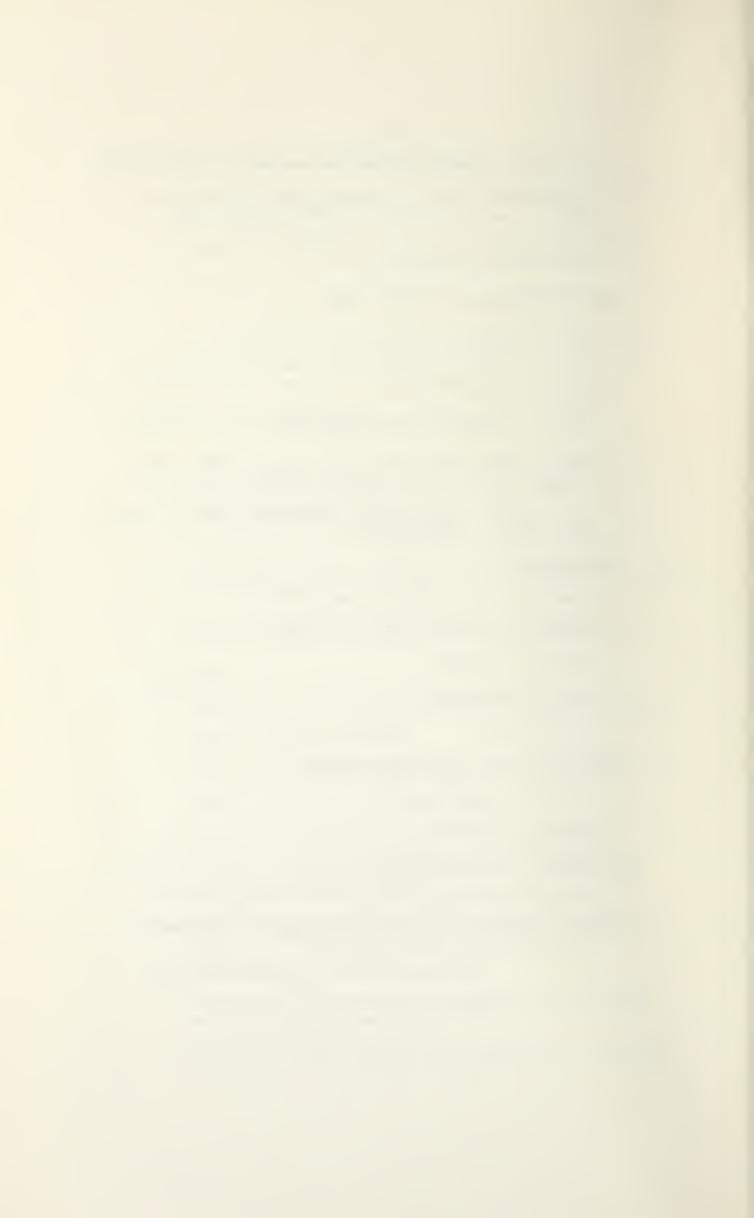
- A. Role of medical students in rural assignments.
- B. Practical roles of barefoot doctors and worker doctors in prevention and treatment of illness and in health education.
- C. Practical experience in a teaching hospital, in a number of areas including the use of anesthesia.
- D. Practical experience with a third year (last year) medical student group during the teaching hospital rotation.
- E. Organization of medical care in production brigade, production team, communes, factories, etc.

IX. CANCER RESEARCH

- A. Organization of research by government.
- B. Diagnostic and mass screening techniques.
- C. Methods of treatment.
- D. Role of chemotherapy.
- E. Viral oncology.

X. MEDICAL EDUCATION, TRAINING AND MANPOWER

- A. Curriculum in medical schools.
- B. Training in traditional medicine.
- C. Division of tasks between physician and physician assistants.
- D. Training of modern and traditional medical specialists.
- E. Role of traditional philosophical thought in the combined system of Chinese-Western practice.







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